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Integration of project management elements as enhancers in the transition to sustainability in inter- and trans-disciplinary research centres

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Declaration

I hereby declare that the contents and organization of this dissertation constitute my own original work and do not compromise in any way the rights of third parties, including those related to the security of personal data.

Ramiro M. Angeli

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Abstract

At present we are facing a high level of sustainability problems, so a restructuring of the educational system and its complex dynamics is expected to manage this situation, promoting a new model based on awareness towards a sustainable society formed by, and for, stakeholders involved, ensuring that the different organizations comply with sustainability criteria. Therefore, it is sought to analyse knowledge co-production approaches in complex project management research. We relate the biophysical, economic and social perspectives by asking: How do the different approaches turn aspects of project management into a research problem and how does this approach relate to others? How does this relate to concrete real-world problems?

This work aims at tapping into management engineering theories of organizational change to find their overlaps with sustainability pedagogies in higher education institutions and research centres to find out how this transition is taking place. After an extensive literature review, the results of 18 semi-structured interviews were elaborated, investigating the coordinators and researchers inter and trans disciplinary project management practices. The approaches used, consciously or not, are highlighted to shape a formative offer toward a sustainability-based course.

Results show what is being currently done, and to which extent transdisciplinarity is used as the key approach to solving wicked problems in a multi-faceted perspective, involving the source dimension from which it operates. According to our dataset, high levels of effort, human care and fair allocation of resources are needed.

Conclusions highlight the unmissable ingredients like soft skills, networking, flexibility and adaptation, open mind and open act, sustainability reports and collaborative work, attitudes and methods like soft agile, theory u, stakeholders' engagement, agile methodologies, system and design thinking to pursue sustainability education with a more systemic and trackable management strategy. Finally, further results need to consider the systemic level of change and approaches like soft agile that are going to help lead this transformation.

Abstract (Italiano)

Attualmente stiamo affrontando un alto livello di problemi di sostenibilità, quindi ci si aspetta una ristrutturazione del sistema educativo e delle sue dinamiche complesse per gestire questa situazione, promuovendo un nuovo modello basato sulla consapevolezza verso una società sostenibile formata da, e per, le parti interessate coinvolte, garantendo che le diverse organizzazioni siano conformi ai criteri di sostenibilità. Si cerca di analizzare gli approcci di co-produzione della conoscenza nella ricerca di gestione di progetti complessi. Mettiamo in relazione le prospettive biofisiche, economiche e sociali chiedendosi: come i diversi approcci trasformano gli aspetti della gestione dei progetti in un problema di ricerca e come questo approccio si relaziona con gli altri? E come si relaziona con i problemi concreti del mondo reale?

Questo lavoro mira ad attingere alle teorie di ingegneria gestionale del cambiamento organizzativo per trovare le loro sovrapposizioni con le pedagogie della sostenibilità negli istituti di istruzione superiore e nei centri di ricerca per scoprire come sta avvenendo questa transizione. Dopo un'ampia revisione della letteratura, sono stati elaborati i risultati di 18 interviste semi-strutturate, indagando le pratiche di gestione di progetti inter e trans disciplinari di coordinatori e ricercatori. Gli approcci utilizzati, consapevolmente o meno, sono evidenziati per modellare un'offerta formativa verso un corso basato sulla sostenibilità.

I risultati mostrano cosa si sta facendo attualmente, e in che misura la transdisciplinarietà è usata come approccio chiave per risolvere problemi in una prospettiva sfaccettata, coinvolgendo la dimensione della fonte da cui si sta operando. Secondo il nostro dataset, sono necessari alti livelli di sforzo, cura umana e giusta allocazione delle risorse.

Le conclusioni evidenziano gli ingredienti imperdibili come le soft skills, il networking, la flessibilità e l'adattamento, la mente aperta e l'atto aperto, i rapporti di sostenibilità e il lavoro collaborativo, gli atteggiamenti e i metodi come il soft agile, la teoria u, il coinvolgimento delle parti interessate, le metodologie agili, il pensiero sistemico e di design per perseguire l'educazione alla sostenibilità con una strategia di gestione più sistemica e tracciabile. Infine, ulteriori risultati devono considerare il livello sistemico del cambiamento e gli approcci come il soft agile che aiuteranno a guidare questa trasformazione.

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Thank you,

Ramiro M. Angeli

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List of Acronyms

AGM: Agile Management Methodologies

APM: Agile Project Management

CCW: Co-creational and Collaborative Work

COCA: Curricula and Organizational Culture sustainability co-adapatation

DT&PBL: System- and Design-Thinking and Problem-Based Learning

GL: Group Level

GM: Governance Management

HEIs: High Education Institutions

ID: Interdisciplinary

IL: Individual Level

ITD: Inter and Transdisciplinary

Le: Leadership

M&I: Motivation and Incentivisation

MA-S: Mixing Art-Science

Ne: Networking

NGOs: Non-governmental organisations

OECD: Organization for Economic Cooperation and Development

OS: Operating Systems

PBL: Problem- and Project-Based Learning

PICO: Participants, Intervention, Comparator and Outcome

PM: Project Management

PMI: Project Management Institute

PMT: Program Management Tools

PT: Personnel Training

SDGs: Sustainable Development Goals

SkE: Stakeholders Engagement

SE: Sustainability Education

SL: System Level

SLR: Systematic Literature Review

SPM: Sustainable Project Management

SR: Sustainability Reports

SS: Soft Skills

TD: Transdisciplinary

TDM: Team Development Models

TL: Transformative Learning

TrUST: Transdisciplinarity for Urban Sustainability Transition

TSL: Transformative Sustainable Learning

UN: United Nations

U-T: Theory U

CHAPTER 1: INTRODUCTION

1.1 Initial Statements and Background

The world is faced with challenges in all three dimensions of sustainable development—economic, social, and environmental. More than 1 billion people are still living in extreme poverty, and income inequality within and among many countries has been rising; at the same time, unsustainable consumption and production patterns have resulted in huge economic and social costs and may endanger life on the planet. Achieving sustainable development will require global actions to deliver on the legitimate aspiration towards further economic and social progress, requiring growth and employment, and at the same time strengthening environmental protection (United Nations, 2013).

Over the past 20 or so years, increased calls have been made by transnational organisations (UN), non-governmental organisations (NGOs) and national governments for education to be oriented towards social change, sustainability and preparing students for life in a global society. This has been described as a curricular global turn in national school pedagogy and curricula, to equip children and young people with the knowledge, skills and dispositions that will make them more aware of, and engaged with, global issues and phenomena (Mannion et al., 2011).

To cope with the previously posed issues, the research is carried out to integrate transdisciplinary project management in a logical framework, by building joint visions of the issue of concern, by finding a common language, by jointly discussing the trade-offs that result from particular choices, and above all through transformative and collaborative learning.

To abroad the work made on the research, a systematic literature review (SLR) was conducted to explore what are the institutions and educators doing today in terms of sustainability education and how transformative learning is helping to make the change happen and this transition on sustainability integrated to the society, also is possible to point out the competencies needed to facilitate such type of education approach.

It is possible to separate in four different topics which we will taking in consideration as principals in our analysis and which will be integrated on the generation of the solution to the issues we have exposed previously. A short explanation of each one of them takes places, and as are widely explained themes, the focus of each topic will be put on its relationship with the aspects of the same that will be used/ analysed in the different cases and strategies of study developed below:

1.1.1 Sustainability Education

With a world population of 7 billion people and limited natural resources, we, as individuals and societies need to learn to live together sustainably. We need to take action responsibly based on the understanding that what we do today can have implications on the lives of people and the planet in future. Sustainability Education (SE) empowers people to change the way they think and work towards a sustainable future (UNESCO, n.d.).

If we define sustainability as addressing the ongoing capacity for Earth to maintain life, and we consider this our goal, SE is how we get there. On this direction, SE is an educational approach that aims to develop students, schools and communities with the values and the motivation to take action for sustainability – in their personal lives (micro), within their community (meso) and also at a global scale (and macro level), now and in the future. This approach aims to build awareness and knowledge of sustainability issues but also to develop students and schools that are able to think critically, innovate and provide solutions towards more sustainable patterns of living (*What is Education for Sustainability? | Getting Started with Sustainability in Schools*, 2015). SE empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability, and a just society, for present and future generations, while respecting cultural diversity.

It is important to inculcate our children with practices and customs that normalise from a young age, as they will be the future agents of change. raising awareness and transmitting values in terms of environmental, social, politic and economic aspects will help us as a society to grow and form those future generations that are so lacking, it also includes and is focused

on partnership to build networks and relationships between different sectors of the community, empowering the connections and communication among them.

Regarding high education institutions (HEIs), the involvement of universities as an educational and research institution, should be the main agent of change providing answers to the problems and challenges of today's society. The main objectives are to illuminate new paradigms that explain reality, to experiment scientifically and technologically with solutions to today's emerging problems, and to train the people who must undertake this change.

The community of the university itself, although less heterogeneous than that of a city or a region, includes different interest groups: the teaching and research staff -experts with a wide and deep knowledge-, a wide diversity of students -young people with training, full of energy and vitality, with a great potential for change-, and a complex network of people, companies and service-providing administrations, which allow the institution to function well. All of them make up an exceptional collective to be able to experiment and put into practice new innovative models of social, economic, and environmental development. For these reasons, universities must become centers of social reference in which management and decision-making policies can be applied to serve as an example and model of sustainability for society in general, or for companies or public or private institutions in particular.

In order for these management policies to be truly effective, it is necessary to promote educational actions to involve the university community in their development. Such actions may be aimed at strengthening the curricular programming of the various degree programs, or at training students through the diversification of extracurricular activities.

It is important to note that the results achieved in terms of raising the awareness of the university community can have a multiplier effect on society as a whole. The university students who are aware of this should transfer the models of sustainable management they have learned and experienced to the public and private institutions where they will be able to develop their future professional lives. It should not be forgotten that today's university students will be responsible for the management of society in the, perhaps, not too distant future. A change in

the way they take on the sustainability of the functioning of institutions can be vital to bring about profound and lasting changes (Gutiérrez et al., 2005).

On this direction is the sustainable education plays such a key role in creating a society more committed to sustainable development, encouraging individuals and groups to reflect upon personal experiences and worldviews, and challenges accepted ways of interpreting and engaging with the world.

Linking education and sustainability

"We know that sustainable development, rather than a goal to be reached, is a process, and therefore progress is not only achieved through the application of techniques and programmes alone. Like social process, it depends on values and forms of human behaviour. This reality confers on education, and more specifically education for sustainability, a strategic role. Indeed, the necessary "reconversion" of education towards sustainable development can and should be a strategic factor that affects the established development model in order to reorient it development model towards sustainability and equity. This is, in short, the aim of the 'United Nations Decade of Education for Sustainable Development' (2005-2014), whose overall objective is to "integrate the values inherent in sustainable development into all aspects of learning with a view to facets of learning with a view to fostering the behavioural changes needed to achieve a more sustainable and just society for all.

Education for sustainability is an international movement of thought and action that promotes respect and care for people - including present and future generations -, diversity, the environment and the planet's resources. Education enables us to understand ourselves and others, as well as to understand the links that bind us to natural links and social environments. This provides us with an excellent basis for building the values that underpin notions of respect and care. Consequently, education for sustainability empowers us to develop behaviours and practices that enable all human beings to meet their basic needs, and to live a fulfilling life. To this end, the educational process has to promote innovative learning - characterised by

anticipation and participation - that allows not only to understand but also to become involved in what we want to understand.

Of course, the quest for sustainability does not only depend on education. There are many other factors that influence the development of values and processes that promote sustainability. governance, gender relations, economic organisation, social and political participation in decision-making, etc. We must bear in mind that education is both a social product and an instrument for the transformation of society itself. If the rest of the social agents do not act in the direction of change, it is very unlikely that education alone will transform society. The complex web of socio-economic structures, production relations, patterns of consumption and, ultimately, the established development model. It is therefore impossible to promote sustainable development without changing these structures." (Huerta, n.d.).

Integrating education and management

The spirit that should govern the design and implementation of education for sustainability programmes should be to encourage participation in the planning and management of sustainable development. Thus, educational practice should be related to the problems and use of resources in each locality and linked to local and regional development. This involvement, moreover, is a form of action that has great educational power since what we learn is fundamentally the result of participation in "meaningful contexts".

The participation of the different social agents, of citizens, in the decisions and actions that shape the type of development is not a luxury or an option, it is a requirement and a condition.

It is a democratic requirement, based on the right of citizens to consultation, initiative and transparency in the management of public affairs; and a necessary condition for these actions to be effective and sustainable.

Only those strategies and plans that reach a consensus with the affected population will go ahead, which depends to a large extent on their knowledge of the proposals, the value they

attach to them and, ultimately, their involvement in them. The decisions that are taken depend, ultimately, on the dominant values of the community. Therefore, solutions must be based on democratic and responsible decisions that take into account the interests of future generations and ensure the real participation of present generations.

The goal of involving the population in the planning and management of development means assuming the role of social dynamization that education for sustainability undoubtedly has, including it together with other elements of a socio-economic nature in the management itself. Thus, social instruments, including education, are tools at the service of a new approach to management oriented towards sustainability.

In this way, education and management are interdependent variables. On one hand, education is a powerful instrument at the service of correct management. On the other hand, the best way to change mentalities is to carry out proper management, since this promotes habits and actions that generate, in fact, a certain culture. Therefore, just as education programmes must take into account the management that is carried out, management projects must take educational aspects into account too. There must be integration and mutual influence." (Huerta, n.d.).

1.1.2 Transformative Learning

Some decades ago, Jack Mezirow, known as the father of transformative learning, who coined and began to spread the meaning of the term, drew attention to the urgency of understanding adult education from a transformative perspective. Mezirow asserted that Adult Education, from this perspective, implies a structural change in the way we see ourselves and our relationships. He added that it is possible to move towards a more inclusive, discriminative, and experience-integrating perspective (Mezirow, 1977). He developed a comprehensive theory of adult learning based on transformation.

Transformative Learning (TL) is "the process of effecting change in a frame of reference (perspective of meanings, habits of thought, mental frameworks) to make them more inclusive, discriminating, open, emotionally capable of change and reflective, so that they generate beliefs and opinions that prove to be more truthful or justified to guide action" according to Jack Mezirow. A frame of reference, that is, a set of assumptions that structure the way we interpret our experience, and it includes a student's habit of the mind, as well as a personal point of view. The habits of mind are affected by previous learning experiences and cultural norms, while the points of view are the student's personal beliefs and attitudes (Mezirow, 1997). There are four processes of learning that Mezirow has identified, firstly *to elaborate an existing point of view* in which is possible to look for further evidence to support our initial bias towards a group and to broaden the scope or intensity of our viewpoint; secondly *to stablish new points of view* we may encounter a new group and create new schemes of negative meaning for them by focusing on their perceived shortcomings, as dictated by our propensity for ethnocentrism; as a third point of learning, *to transform previous point of view,* it is possible to build through experiences, new experiences and interactions with new people, situations that make us critically reflect on our ideas and preconceptions. In this way, we can generate a change in the point of view on particular issues. Thus, we may become more tolerant or more accepting of groups, situations, etc.; and as the fourth point, last but not least, we may *transform habits of the mind* by becoming aware and critically reflective of our generalized bias in the way we view groups other than our own. Such epochal transformations are less common and more difficult. We do not make transformative changes in the way we learn as long as what we learn fits comfortably in our existing frames of reference.

Transformative learning requires a very different form of education from that commonly associated with children. New information is only a resource in the adult learning process. To become meaningful, learning requires that new information be incorporated by the learner into an already well-developed symbolic frame of reference, an active process involving thought, feelings, and disposition. The learner may also have to be helped to transform his or her frame of reference to fully understand the experience (Mezirow, 1997).

This area of study is in continuous growing and being spread all over the world, it has significant implications for the practice of general teaching. The growth is so significant that it seems to have replaced andragogy as the dominant educational philosophy of adult education, offering teaching practices grounded in empirical research and supported by sound theoretical assumptions. Also, as previously discussed, there is the emerging presence of alternative conceptions of transformative learning, challenging scholars and educators to look beyond transformative learning as defined by Mezirow. Would be strictly necessary to develop the compromise from the students in fostering transformative learning in the classroom, understanding its peripheral consequences and the impacts and implications that it could have (Taylor, 2008). From both parts, including also educators, is necessary assume their responsibilities and compromise themselves with the transformation in the different levels, having a clear understanding about the fostering of transformative learning, knowing that it is much more than implementing a series of institutional strategies with learners, but rather about educating from a particular worldview, a particular educational philosophy.

1.1.3 Inter and Transdisciplinary (ITD)

Clearly the evolution in different sectors of society, technology, industry, means that we need to come together in teams that integrate multiple professionals, that have different skills and backgrounds to be able to deal with the complexity of today's problems. This is why it is becoming increasingly important to have organised, interdisciplinary teams, but on the other hand, today's world has become so uncertain that it is necessary to integrate external actors who contribute their knowledge, experience, or all the contributions that help to generate the best solutions for the development of projects that seek to generate an increase in sustainability.

“Today there is no consensual definition of interdisciplinary and transdisciplinary contributions. Current confusion and misunderstandings about multidisciplinary, interdisciplinary, and transdisciplinary contributions to scientific research, formal education programmes, and professional practice have a history that can be traced back at least to the

seminar organized by the Organization for Economic Cooperation and Development (OECD) in 1970.

When dealing with complex subjects, such as core environmental questions, it is necessary to shift from mono-disciplinary to interdisciplinary and transdisciplinary concepts and methods. In order to be effective, this shift should be founded on a clarification of definitions, goals, and methods. Each discipline has its own concepts, definitions, and methodological protocols for the study of its precisely defined domain of competence. Multi-disciplinary refers to an additive research agenda in which each researcher remains within his or her discipline and applies its concepts and methods without necessarily sharing a common goal with other researchers. Interdisciplinary studies are those in which concerted action and integration are accepted by researchers in different disciplines as a means to achieve a shared goal that usually is a common subject of study. In contrast, transdisciplinary contributions incorporate a combination of concepts and knowledge not only used by academics and researchers but also other actors in civic society, including representatives of the private sector, public administrators, and the public. These contributions enable the cross-fertilisation of knowledge and experiences from diverse groups of people that can promote an enlarged vision of a subject, as well as new explanatory theories. Rather than being an end in itself, this kind of research is a way of achieving innovative goals, enriched understanding, and a synergy of new methods. Multidisciplinary, interdisciplinarity, and transdisciplinarity are complementary rather than being mutually exclusive. Both interdisciplinary and transdisciplinary research and practice require a common conceptual framework and analytical methods based on shared terminology, mental images, and common goals. Without specialised disciplinary studies, there would be no in-depth knowledge and data.

What is interdisciplinarity?

It is generally accepted that interdisciplinary contributions involve the collaboration and cooperation of scientists from at least two disciplines who apply their disciplinary competence to work on common questions and the achievement of shared results. The core

characteristic of interdisciplinary approaches is their goal to integrate concepts, methods, and principles from different disciplines.

What is transdisciplinarity?

Transdisciplinarity is an ambiguous term that has been interpreted in various ways. Balsiger noted that there is no complete history of this term or concept. Like interdisciplinarity, there seems to be no consensus about its meaning. This being said, several shared aims of transdisciplinarity can be identified by an analysis of recent publications." (Lawrence, 2010).

Strategy for investigation

"It is considered very important to be aware of how researchers who approach transdisciplinary collaboration manage to establish a working methodology. The purpose of describing them below is so that people interested in transdisciplinarity know not only what it is, but how it is done. The suggested steps for designing, in addition to the methodology, a research strategy are as follows:

1-Define the common object, system or field of study to be studied. As already described, these are complex fields; 2- Establish the ethical principles to be respected; 3- Determine the necessary knowledge about the field to be investigated and the values to be protected, fundamentally those of truth and justice; 4- Develop the framework for the integration of knowledge; 5- Distribute the research activities of the team members and the necessary communication between them. There are activities that must be carried out in a continuous exchange of findings, and it is convenient to specify them. It is convenient to have general group meetings to exchange information and points of view; 6- Gather available information and investigate the new information required; 7- Resolve conflicts between terms and concepts, which implies establishing a common language to understand each other. The latter is a great virtue of transdisciplinary because it makes the work of researchers possible and shows how it is being processed for the knowledge of those who have an interest in the field of knowledge.

Transdisciplinary is, as can be seen, a form of collective work that includes values and contributes to sustainable human development, in which the application of these values and the maintenance and progress of human life are realised. This requires respect for ethical principles and for nature, which is what allows the protection, survival and fair and equitable coexistence of the human beings that inhabit planet Earth to be firmly sustained." (Paoli Bolio, 2019).

"There is an urgent need for innovative approaches in many situations, such as the blatant failure of the wealthiest countries of the world to deal with a wide range of challenges. For example, the necessity of addressing environmental concerns has not been recognized by all actors and institutions in developed and so-called developing countries as being essential for sustaining human living conditions on earth. Many governments in these countries have not realized the urgency of mitigating the consequences of their ways of life by the implementation of innovative policies. This inertia has some of its origins in the lack of interdisciplinary and transdisciplinary contributions. Most scientific contributions on this subject are completed by the bio-physical environmental sciences in order to understand the changes and impacts in the bio-physical environment. Nevertheless, analyses of the behaviour and organization of human societies are also needed to address the situation with political tools. Therefore, at the very least, multidisciplinarity is required to address this complex issue in its globality. However, the different epistemologies of each discipline and science (in both the natural and human sciences) raise difficulties for collaboration, preventing strong interdisciplinarity, especially when treated within traditional disciplinary scientific methodological frameworks. The practical solution will lie in the capacity of teams of researchers and representatives of civil society to join their research objectives by building dialogue.

However, even as many researchers and practitioners no longer question the need for interdisciplinary contributions, transdisciplinary approaches are still not yet commonly applied in order to address core environmental questions." (Lawrence, 2010)

1.1.4 Project Management

The term Project Management (PM) is a very broad concept, which encompasses different tools, methodologies, and techniques, which are jointly and/or individually used in

the development of different projects, in multiple areas and in projects of all scales. In the following section, a general description of what project management is will be made targeting an understandable description of the concept, and I will try to focus on the definition of particular methodologies that will be mainly used in the development of the research.

Then, on basis of Project Management Institute (PMI) literature, the following question will be answered: What is Project Management? But, for answering this question would be better to start explaining what a project is and involve. Hence, a project could be defined as "a temporary endeavour undertaken to create a unique product, service or result". It has different characteristics such as for example that is *temporary* because it has a defined beginning and end in time, and therefore defined scope and resources. On the other hand, a project is *unique* in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal. So, a project team often includes people who do not usually work together – sometimes from different organizations and across multiple geographies. All the previously described features must be expertly managed to deliver the on-time, on-budget results, learning and integration that organizations need.

"Project management, then, is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements."(Project Management Institute, n.d.)

There exist different processes on the practice of PM which could be classified on: 1- Initiating; 2- Planning; 3- Executing; 4- Monitoring and Controlling; 5- Closing. And besides that, there also the knowledge draws on ten areas: 1- Integration; 2- Scope; 3- Time; 4- Cost; 5- Quality; 6- Procurement; 7- Human resources; 8- Communications; 9- Risk management; 10- Stakeholder management. As is described in the PMI website and is necessary to highlight, all management is concerned with these, of course, but project management brings a unique focus shaped by the goals, resources and schedule of each project (Project Management Institute, n.d.).

1.1.4.1 Theory U

In the following paragraphs, will be introduced some principal aspects of the Theory U, a theory which was developed by Otto Scharmer, and is nowadays being used and in constant application on many different fields. Scharmer with other colleagues, have conducted different investigations with some accomplished leaders, entrepreneurs, and innovators in science, business and society to extend the basic principles into a theory of learning and management, which he calls Theory U.

According to the description of Scharmer in his book "The Essentials of Theory U", it is "an awareness-based method for changing systems", it also blends systems thinking, innovation, and leading change from the viewpoint of an evolving human consciousness. After a few decades of evolving people on it, and make the application and development on different fields of study, Theory U comprises three main elements: 1- A framework for seeing the blind spot of leadership and systems change; 2- A method for implementing awareness-based change: process, principles, practices; and 3- A new narrative for evolutionary societal change: updating our mental and institutional operating systems (OS) in all of society's sectors (O. Scharmer, 2018).

As its core, Theory U makes a distinction between the different ways that action and attention come into the world. It draws our attention to the *blind spot* in leadership today: the "interior conditions," the sources from which we operate both individually and collectively. It is necessary to pay attention to the *source*, the interior condition from which we operate, which belongs to the invisible source dimension of the social field, to the quality of relationships that we have to each other, to the system, and to ourselves (O. Scharmer, 2018).

The U used to be defined as "One Process, Five Movements", and it could be defined following the diagram below in which we move down one side of the U connecting us to the world that is outside of our existing paradigm (outside of our institutional bubble), to the bottom of the U we connect with the world that emerges from within, and moving up the other side of the U we attempt to bring forth the new into the world:

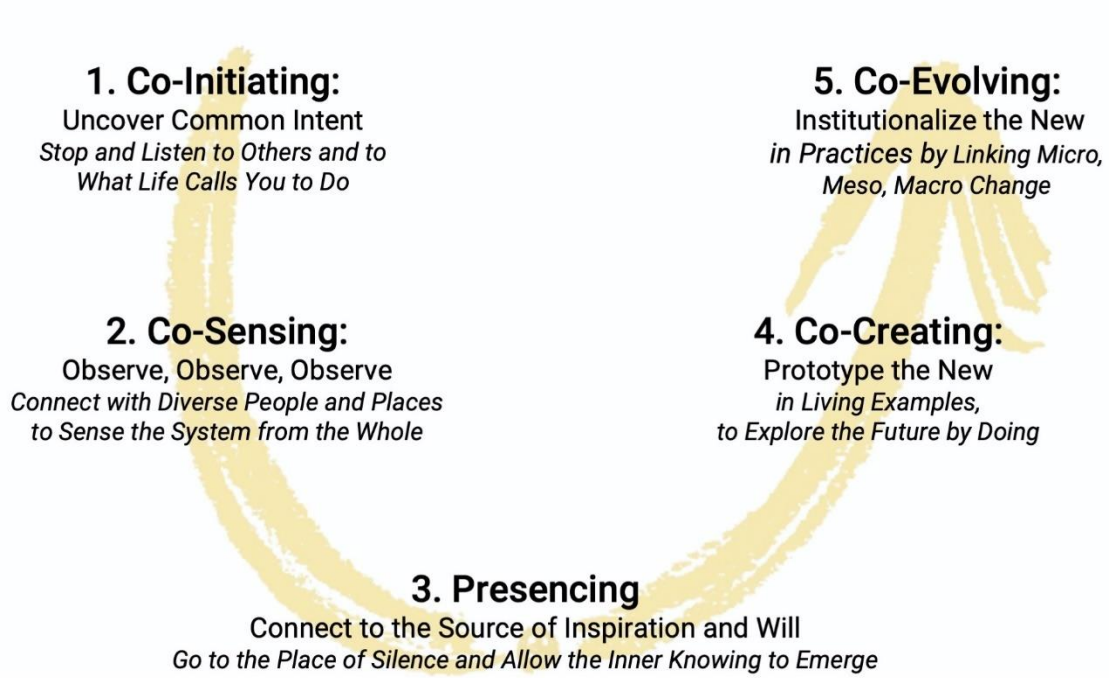

Figure 1. Theory U: One Process, Five Movements

1. Co-Initiating: When a new project begins one or a few key individuals gather together with the intention of making a difference in a situation that really matters to them and to their communities. They maintain a common intention around their purpose, the people they want to involve, and the process they want to use. The context that allows such a core group to form is a process of deep listening—listening to what life calls you and others to do.

2. Co-Sensing: The limiting factor of transformational change is not a lack of vision or ideas, but an inability to *sense.* When the members of a group see together with depth and clarity, they become aware of their own collective potential—almost as if a new, collective organ of sight was opening up. When sensing happens, the group as a whole can see the emerging opportunities and the key systemic forces at issue.

3. Presencing: At the bottom of the U, individuals or groups on the U journey come to a threshold that requires a "letting go" of everything that is not essential. The essence of presencing is the experience of the coming in of the new and the transformation of the old. Once a group crosses this threshold, nothing remains the same. Individual members and the group as a whole begin to operate with a heightened level of energy and sense of future possibility. Often, they then begin to function as an intentional vehicle for the future that they feel wants to emerge.

4. Co-Creating: The co-creation movement of the U journey results in a set of small living examples that explore the future by doing. It also results in a vibrant and rapidly widening network of change-makers who leverage their learning across prototypes and who help each other deal with whatever innovation challenges they face.

5. Co-Evolving: Coming up with a sound assessment at this stage often requires the involvement of stakeholders from other institutions and sectors. Very often, what you think you will create at the beginning of the U process is quite different from what eventually emerges. The co-evolving movement results in an innovation ecosystem that connects high leverage prototype initiatives with the institutions and players that can help take it to the next level of piloting and scaling.

All the five movements of the U apply both to the macro level of innovation projects and change architectures and to the meso and micro levels of group conversation or one-on-one interactions (C. O. O. Scharmer, 2007).

In that way, Scharmer defines as the central essence of the theory and systems thinking is about making a system *sense* and *see* itself, that would really be the central leverage point of intervening in any kind of system, because in the moment you succeed in making a system to become in sensing and seeing itself, the consciousness is switching to a higher level of perception. It takes people through the transformational change, making them get involve in systems of leadership. Theory U offers the set of principals and practices for letting go the past and collectively creating an emerging better future, for this, one of the aims is to be shifting our consciousness from ego-system to eco-system awareness following certain steps along this journey through the "U" diagram, which develops seven essential leadership capacities that will be explained and applied in the development of the thesis:

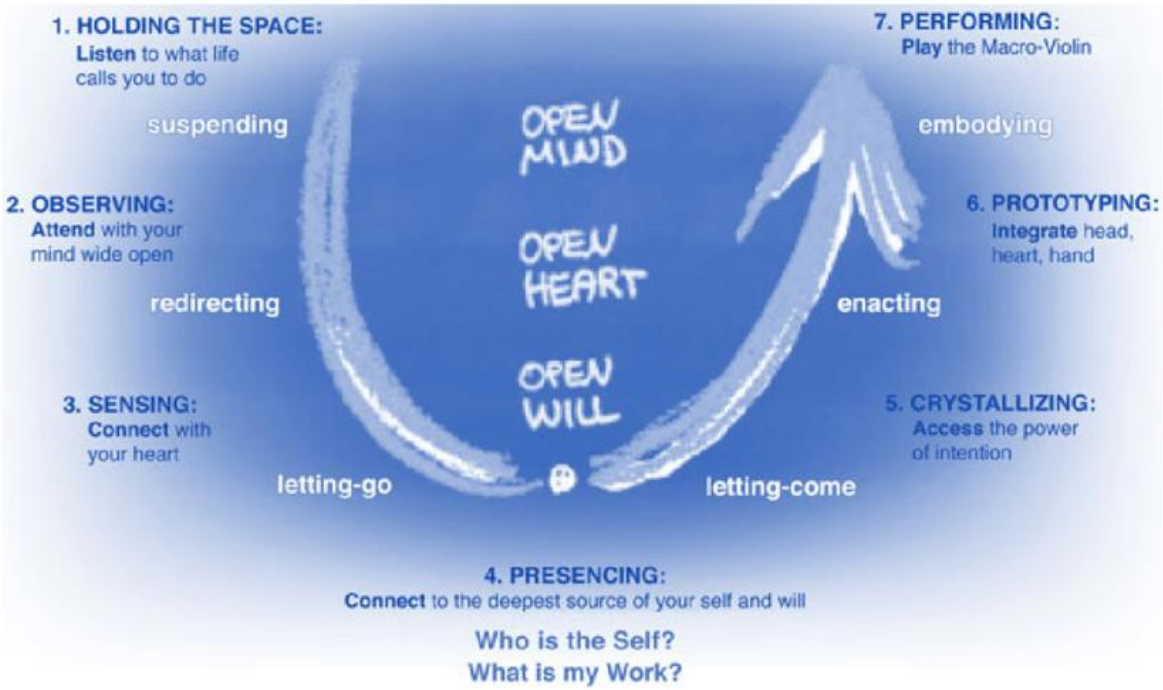

Figure 2. Seven leadership capacities

1- Holding the Space of Listening: The foundational capacity of the U is listening. Listening to others, to oneself and to what emerges from the collective. Effective listening requires the creation of open space in which others can contribute to the whole.

2- Observing: The capacity to suspend the "voice of judgment" is key to moving from projection to focused and peripheral observation.

3- Sensing: Seeing the system from the edges. The preparation for the experience at the bottom of the U requires the tuning of three inner instruments: the open mind, the open heart, and the open will. This opening process is an active "sensing" together as a group. While an open heart allows us to see a situation from the current whole, the open will enables us to begin to sense from the whole that is wanting to emerge.

4- Presencing: The capacity to connect to the deepest sources of self—to go to the inner place of stillness where knowing comes to surface.

5- Crystallizing: When a small group of change makers commit to a shared purpose, the power of their intention creates an energy field that attracts people, opportunities, and resources that make things happen. This core group and its container functions as a vehicle for the whole to manifest.

6- Prototyping: Moving down the left side of the U requires the group to open up and deal with the resistance of thought, emotion, and will; moving up the right side requires the integration of thinking, feeling, and will in the context of practical applications and learning by doing.

7- Co-Evolving: A prominent violinist once said that he couldn't simply play his violin in Chartres cathedral; he had to "play" the entire space, what he called the "macro violin," in order to do justice to both the space and the music. Likewise, organizations need to perform at this macro level: they need to convene the right sets of players in order to help them to co-sensing and co-create at the scale of the whole (*Presencing Institute - Theory U: Leading From the Future As It Emerges*, n.d.).

On one of his books, Scharmer analyse and map what he calls “the deeper territory” and he discussed with professionals of different fields such as Franco Varela, a cognitive scientist who made reference to the *blind spot* of cognition and brain research. He state that “The problem is not that we don’t know enough about the brain or about biology, the problem is that we don’t know enough about experience”, on this direction, he asked if “Can people cultivate the core process of becoming aware as an ability?” and for him, the core process is composed of “three gestures of becoming aware: *suspension*, *redirection*, and *letting go*.” Going through the three gestures, by *suspension* he meant the suspension of habitual patterns, *redirection* is about redirecting your attention from the “exterior” to the “interior” by turning the attention toward the source of the mental process rather than the object and the concept of *letting go* has to be done with a light touch. These three gestures were mapped on the left-hand of the U as gateways into the deeper layers of awareness; then, on the right-hand side, they are mirrored by their counterparts on the way up: *letting come, enacting and embodying*, concepts in which we will enter on detail after.

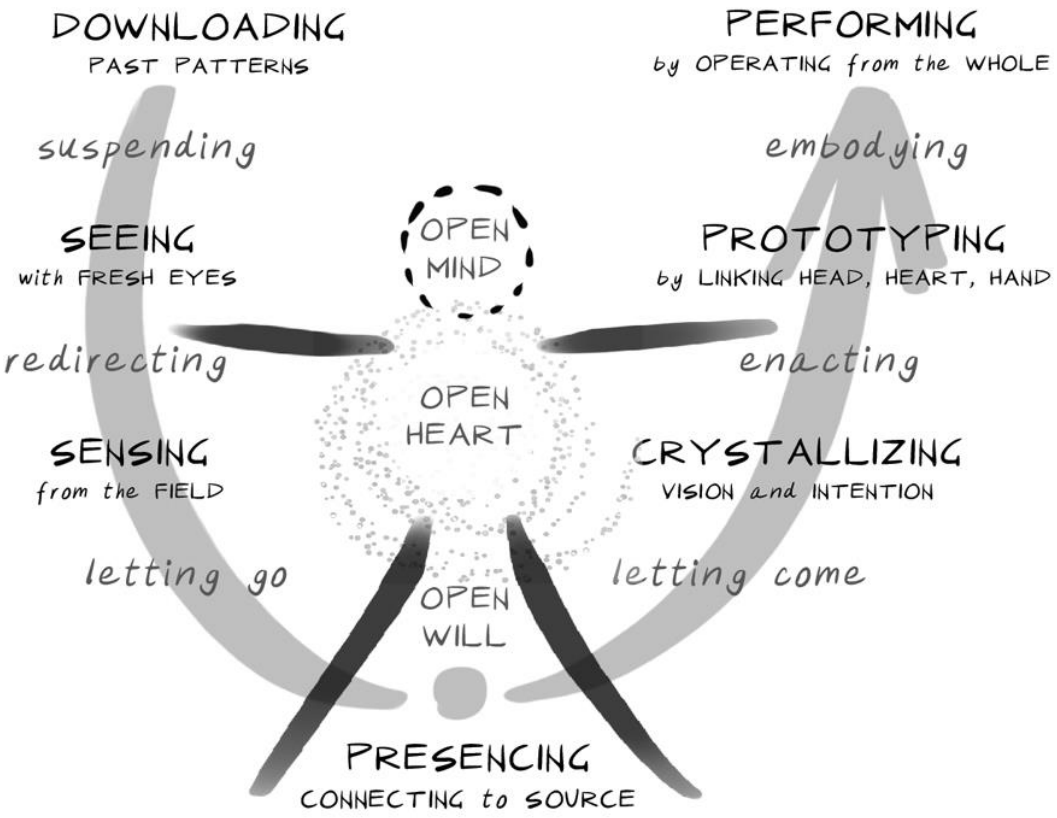

Figure 3. Theory U: Seven Ways of Attending and Co-Shaping

The ***Figure 3*** shows the core process of Theory U and the seven ways of attending to and co-shaping the world. Whoever goes through this process experiences the following subtle shifts of the cognitive social field:

- Downloading: At the beginning there is a spark of becoming aware that moves us beyond downloading—beyond extending the patterns of the past. As long as we operate from downloading, the world is frozen by our old mental habits and past experiences; nothing new enters our minds. Same old, same old.

- Seeing: The moment we suspend our habitual judgment we wake up with fresh eyes. We notice what is new and see the world as a set of objects that are exterior to us, the observers.

- Sensing: The moment we redirect our attention from objects to source, our perception widens and deepens. This shift bends the beam of observation back onto the observer. The boundary between observer and observed opens up.

- Presencing: Entering a moment of stillness, we let go of the old and connect to the surrounding sphere of future potential. The boundary between observer and observed collapses into a space for the future to emerge.

- Crystallizing: As we let come and crystallize vision and intention, the relationship between observer and observed starts to invert. Envisioning happens from the field of the future (rather than from our ego).

- Prototyping: As we enact prototypes, we explore the future by doing. The relationship between observer and observed continues its inversion. Enacting happens from "being in dialogue with the universe" (rather than from our ego).

- Performing: As we embody the new by evolving our practices and infrastructures, the relationship between observer and observed completes its inversion. The embodying happens from the context of the larger eco-system (rather than from the small "s" institutional self).

At the heart of Theory U we can find the inner conditions on the interior dimension of the intervener. The inner territory could be understood by defining three instruments: open mind, open heart, and open will, depicted in *Figure 3*: An *open mind* is the capacity to suspend old

habits of judgment—to see with fresh eyes. An *open heart* is the capacity to empathize and to look at a situation through the eyes of somebody else. An *open will* is the capacity to "let go" of the old and "let come" the new (O. Scharmer, 2018).

In a nutshell, Theory U gives in its outcome an operation from the whole with a renewed and more complex sense of connection to ourselves, and makes us think on why we are doing what we are doing. It also tries to tap into the deeper sources of excellence and thus grow our leadership capacities. It is a method that takes us through a process to improve our quality *attention* and *intention*.

1.1.4.2 Agile Project Management

Agile project management (APM) is an iterative approach to delivering a project throughout its life cycle, it is also a project management methodology towards agile manufacturing. Iterative or agile life cycles are composed of several iterations or incremental steps towards the completion of a project. Iterative approaches are frequently used in software development projects to promote velocity and adaptability since the benefit of iteration is that you can adjust as you go along rather than following a linear path. One of the aims of an agile or iterative approach is to release benefits throughout the process rather than only at the end. At the core, agile projects should exhibit central values and behaviours of trust, flexibility, empowerment and collaboration. (apm, 2021)

"Being agile requires a great behavioural change which affects the way of thinking and acting of team members in the enterprise. Traditionally, project managers have a structured and planned management, avoiding change of plans whereas APM focal point its to adapt and respond to inevitable changes, focus on continuous innovation, product adaptability, improved time-to-market, people and process adaptability, quality, and reliable results, so APM could not suited to any work environment. For this reason, APM is a project management approach that must be adopted if the organization/company as agile as an intrinsic value in its culture and

strategy and there are variables to consider such as the type of problem, organization, workforce and the worldview of leader". (Loiro et al., 2019)

The agile philosophy concentrates on empowered people and their interactions and early and constant delivery of value into an enterprise. Agile project management focuses on delivering maximum value against business priorities in the time and budget allowed, especially when the drive to deliver is greater than the risk. Principles include:

- The project breaks a requirement into smaller pieces, which are then prioritised by the team in terms of importance.
- The agile project promotes collaborative working, especially with the customer.
- The agile project reflects, learns and adjusts at regular intervals to ensure that the customer is always satisfied and is provided with outcomes that result in benefits.
- Agile methods integrate planning with execution, allowing an organisation to create a working mindset that helps a team respond effectively to changing requirements.

APM in education

Regarding APM in education, we can have the **Table *1***, which shows the values defined in the Agile Manifesto and the applied map-ping, which consists of the translation of software development figures and roles to the education environment (Stewart et al., 2009).

Value	Agile Manifesto	Agile Manifesto in Education
1	Individuals and interactions, over process and tools.	Students over traditional processes and tools

2	Working software, over comprehensive documentation.	Working projects over comprehensive documentation.
3	Customer collaboration, over contract negotiation.	Student and instructor collaboration over rigid course syllabi.
4	Responding to change, over following a plan.	Responding to feedback rather than following a plan.

Table 1. Values defined by Agile Manifesto

As it is shown in the table, the first value favours student-centric environments as the most effective method of learning. In the Agile school, the old-fashioned lecture-driven environment is considered as surpassed. The students participate actively in the learning process through activities and group-based components aiming at reinforcing concepts and allowing for exploration.

The second value in education favours the production of working projects from the beginning, without waiting for the end of a project-based course. The students work in an iterative environment with a strong deliver-able component, leading to higher immersion in the project, more learning, and final deliverables of better quality.

The third value allows having an environment focused on what the students are doing and which pedagogical methods can facilitate the learning. In traditional courses, the syllabus is outlined as a strict contract between the student and the instructor. Within the Agile school, the students and instructor can establish a more flexible and collaborative relationship, similar to the way that developers and customers collaborate following the Agile approach.

Finally, with the fourth value, agility is applied so that different learning approaches can be adopted, and delivery methods changed if the current methods are not producing the expected results.

There is also reported studies about applying agile to two project-based learning (PBL) courses in electrical engineering (Seman, Hausmann, & Bezerra, 2018). The results showed the importance of the humanization feature in learning, automatically given by applying agile, as a fundamental part of the education process. Finally, the literature reports many cases in which agile was exploited for its useful tools, not necessarily applying a full methodology.

SCRUM

Scrum is one of the most employed process frameworks implementing Agile values and principles. In Scrum, the software is developed by following an iterative model used to manage people and complex projects. **Figure 4** shows the Scrum lifecycle. It follows a set of roles, responsibilities, and meeting that never change. With Scrum, the products are built in a series of fixed-length iterations, short and on a regular cadence, defined as “sprints”. During these intervals, teams have the time to develop the soft-ware and at the end of each sprint, i.e., the “milestone”, the progress is tangible.

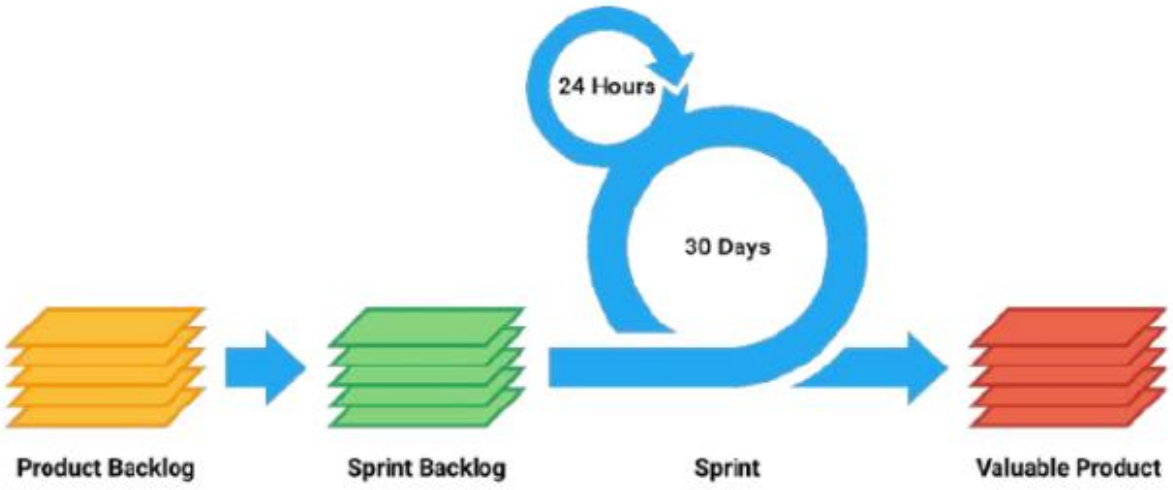

Figure 4. SCRUM methodology graphic summary

By using short iterations, the importance of a good estimation and a fast feedback from tests are reinforced.

Everyone in Scrum plays a specific role:

- Product owner: serves as an interface between the development team and its customers. S/he is responsible for checking that the expectations, in the form of a prioritized wish list called “product backlog”, are respected;
- Scrum master: a facilitator within the team members. S/he is responsible for ensuring that the Scrum best practices are respected, and the project moves for-ward;
- Scrum development team: comprehends the developers that work together to create and test incremental releases of the product.

Regarding education, many researchers worked on ways to adapt Scrum to the educational context. One relevant attempt is given from “eduScrum” (Delhij, van Solingen, & Wijnands, 2015), a guide that translates the Scrum process, roles and responsibilities in pedagogic terms and that can potentially be applied to teach any subject at any education level.

The teacher assumes the role of product owner, who decides what needs to be learned, monitors, processes, and evaluates the students. His/her main goal is delivering the highest value, in terms of both discipline specific learning outcomes and soft skills such as organization, planning, collaboration and teamwork. The student team is self-organized and aims at acquiring (delivering) learning results iteratively and incrementally. An eduScrum master, who is chosen by the product owner or the class, acts as a coaching leader and helps the team to perform optimally. Even the sprints are mapped into the education context. The tasks are considered as time-boxed events with a maximum duration and designed to allow critical transparency and inspection. Thus, the sprints are collections of tasks, coherently organized to achieve the learning goals, and usually have a duration of 2 months or less. (Salza et al., 2019).

1.1.4.3 Agile U or Soft Agile

An integration can be made between concepts such as theory U and agile, which has been worked on in recent times, Helio Borges then poses, how theory-U and agile complement each other?

"We based our application arguing that any startup is Agile per definition, and so are tech companies, it is their nature because their ADN is Agile. On the contrary, existing corporations have to change the organizational culture to carry out a company-wide change initiative. Changing the culture has been one of the historic challenges in any transformation project carried out in organizations, even when they are done under Agile methodologies. According to the Allied Alliance, "company philosophy or culture at odds with core agile values was the leading cause of failed agile projects. In fact, it was interesting to note that two of the top five reasons that caused agile failures revolve around the organization's culture — company philosophy or culture at odds with core values and a lack of support for cultural transition (#5). That statement reminded me of what Peter Drucker said, "Culture eats Strategy for breakfast any time".

The lack of awareness and silo mentality of the organization's leadership and management isolate the agile teams and derail any company-wide innovation process for not integrating culture change as part of the transformation effort. Theory U is an Awareness Based Systems Change methodology that addresses that "Blind Spot of Leadership" head-on. Awareness Based Systems Change can be described by the following three sentences, the first of which is from Kurt Lewin:

"You cannot understand a system unless you change it. You cannot change a system unless you transform consciousness. You cannot transform consciousness unless you can make a system see and sense itself." Otto Scharmer

Therefore, integrating Agile tools and practices into the Theory U process, and the latter providing Agile with a solid and proven awareness-based organizational transformation methodology, was a natural process of letting the emerging future come. On December 15th,

2020, the Presencing Institute notified us of our acceptance to the program, now we had to look for the rest of the members of our Core Team. In one week we had turned one idea into action, it was a small step, but as time went by, we began to realize the significance of it." (Borges, 2021).

1.2 TrUST Project

TrUST project by its acronym - Transdisciplinarity for Urban Sustainability Transition – emerges as a solution to address some aspects of contemporary urban change, characterised by increasing complexity and uncertainty. In this way, together with numerous partners and peers, belonging to different areas such as universities, third sector organisations, NGOs, business companies, all spread around the world, but with the aim of supporting and collaborating towards the transition we are talking about towards sustainability in all its aspects. The main aims of the project are:

- "To review of the current literature describing tools and methodologies for ITD research and education practices";

- "To conduct a comparative analysis and field works within EU-World renown academic institutions working on global urban challenges within the Sustainable Development Goals strategic framework";

- "To perform a mapping exercise and capacity building activities inside the ITD landscape of POLITO members and the TrUST platform".

The following research has been conducted based on the material and under the guidance of the TrUST project team directors. TrUST "is a research project that aims at better understanding how to achieve more efficient and effective inter/trans-disciplinary research and education for ***urban sustainability transitions***" (*TrUST*, n.d.). The project studies the state of contemporary centres performing inter/transdisciplinary research and education, and it is also viewed as a link with the work that is performed with the SDGs, for that reason, the project

aims to “identify the synergies and differences in the current landscape of inter/trans-disciplinary (ITD) research and education strategies, methodologies and tools in academic urban labs framing the 17 SDGs”. In this way there are two main tracks being followed:

- ITD Research Track which aims to explore how urban research labs are currently working on sustainability transition via an ITD approach, and,
- ITD Education Track which aims to bring people together who are interested in improving their ITD perspectives, and who are recently been involved in EU-funded projects on issues relating the transformative education towards a global citizenship concept.

In line with this, a set of 30 semi-structured interviews within the member of the TrUST platform all over the world have been prepared with the help of sociologists, psychologists and ITD experts. The results of them are being transcribed and analysed by a team of experts trying to scout barriers and triggers to ITD effective environments. On the other hand, an international ITD workshop has been hosted by TrUST in synergy with the H2020 EU funded project SHAPE-ID. In the TrUST Unconference, the writing workshop gathers contributors for a practical toolbox for developing the taxonomy of arts, social science and humanities (ASSH) integration modalities, to apply academic rigour to approaches to enhance ITD integration.

Based on these results and on the conclusions extracted until the moment of the development of this work, from the experts working on the project, these are with which the author has worked for analyse and find the results exposed on this thesis

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1.3 Objectives of the Investigation

1.3.1 General Objective

To identify and analyse how institutions are working today in the transition towards transformation in sustainability education/ research, and based on the findings, point out how ITD project management could be integrated in improving this change.

1.3.2 Specific Objectives

- Identify and report which are the PM approaches and methods which fits better for strengthen ITD sustainability education.
- Identify and report how transformational learning is empowering the engagement of educators and learners towards the transition in ITD sustainability education.
- Classify and provide a set of specific tools and methodologies belonging to the ITD PM world, which are useful to enhance the transition towards sustainability education.
- Expose the relationship between project management and sustainability education, highlighting how they can enhance each other.

1.4 Research Question

Considering the goals of the study taken into consideration previously, the research question to answer is:

How existing sustainability education can be transformed, and how could we enhance it by using project management and inter- and transdisciplinary tools, methods and practices?

1.5 Methodology and Methods

In order to achieve the objective of the thesis, we seek to answer the research question by conducting a systematic literature review (SLR), which is "a research method and process for identifying and critically appraising relevant research, as well as for collecting and analysing data from such research" (Snyder, 2019). On the other hand, interviews are held with multiple professionals who work and are related to the topic under discussion, in order to obtain their experiences, points of view, opinions and thus be able to extract from them the information that is necessary to carry out a useful work for later decision making.

On the first place, SLR is carried out in various selected databases, according to different criteria, in order to have support material and a greater knowledge on the part of the author about the topics under discussion, their interrelations and the contributions that can be generated with them.

Then, the interviews are carried out, characterising the sample we have, in order to have the magnitude of the subsequent results. The interviews are transcribed, coded, classified and arranged in order to have a data display that is easy to read and interpret.

Afterwards, an exhaustive analysis is made of each of the interviews, conclusions are drawn individually, and recognition is given from a professional perspective, biased by the search for the stated objective, relating PM and SE, their tools and methodologies that correlate them. Finally, the key elements belonging to each world are extracted, in order to obtain a toolkit that allows the coping of the situations studied and evidenced by the interviewed participants.

As a last section, a discussion and conclusions are made, which seek to objectively approve or refute the hypothesis, and provide the tools that stand out as enhancers and problem solvers for the generation of the transition towards education in sustainability, and towards a more sustainable world.

1.6 Thesis Structure

As for the structure of the paper, the thesis is organized as indicated below:

In this first chapter are presented the topics to be addressed throughout the thesis development, is explained the structure of the research and how will it be approached, also is introduced TrUST project, on which we are going to base the research, and last but not least, the objectives and the question of the investigation are formulated.

In the second chapter, the methodology is described in detail, the elements of the methodological process that have guided the different techniques used for the analysis in order to respond to the research objectives are described.

In the third chapter appears the different results that come up from the investigation (to be completed with se selection criteria and the procedures carried out in the study).

In the fourth chapter the results obtained at the end of the entire proposed methodological procedure will be exposed, matching them with the objectives set for the investigation.

In the last chapter the results are discussed and perspectives and suggestions for further developments for continue the work are reported.

CHAPTER 2: METHODOLOGY

2.1 Systematic Literature Review

Systematic Literature Reviews (SLR) are the reference standard for synthesizing evidence in health care because of their methodological rigor. They are used to support the development of clinical practice guidelines and inform clinical decision-making. They are becoming increasingly common. Ideally, systematic reviews are based on pre-defined eligibility criteria and conducted according to a pre-defined methodological approach as outlined in an associated protocol (Moher et al., 2016). In 1993, Archie Cochrane founded the Cochrane Collaboration, an independent, not-for-profit organization that produces systematic literature reviews of interventions in healthcare3 that are published in the Cochrane Library. It has over 10,000 reviewers internationally4 and is organized into review groups, each with a specific area of interest (Nightingale, 2009). In the healthcare field diverse guidelines to conduct a SLR have been produced such the PRISMA statement or the Cochrane Handbook for Systematic Reviews of Interventions. However, SLR is not restricted to healthcare, many researchers have developed SLR in different knowledge fields.

SLR aim to identify all research addressing a specific question so that they give a balanced and unbiased summary of the literature. The methods used to identify studies for inclusion in systematic reviews have been developed specifically to identify the negative studies that might be published in low impact journals or within conference proceedings, which are not indexed in the bibliographic databases, but which might balance the results of the more easily identified positive studies (Nightingale, 2009).

Thus, is important to highlight that the objective of this systematic literature review was to identify, review and analyse the different advancements in terms of transformative sustainability education, from the work that is being realized for generating this transition until the integration of a transdisciplinary project management approach to enhance this diffusion. In that way it was looked for meet the objectives of the research, declared previously. For the conduction of the SRL, a review protocol was adapted and used from the PRISMA-P 2015

methods' section, for this paper. The following checklist has been adapted for use with protocol submissions to Systematic Reviews from Table 3 in Moher D et al: Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement.

Section/ Topic	Checklist Item
Elegibility Criteria	Specify the study characteristics (e.g., PICO, study design, setting, time frame) and report characteristics (e.g., years considered, language, publication status) to be used as criteria for eligibility for the review
Information Sources	Describe all intended information sources (e.g., electronic databases, contact with study authors, trial registers, or other grey literature sources) with planned dates of coverage
Search Strategy	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated
STUDY RECORDS	
Data Management	Describe the mechanism(s) that will be used to manage records and data throughout the review

Selection Process	State the process that will be used for selecting studies (e.g., two independent reviewers) through each phase of the review (i.e., screening, eligibility, and inclusion in meta-analysis)
Data Collection Process	Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators
Data Items	List and define all variables for which data will be sought (e.g., PICO items, funding sources), any pre-planned data assumptions and simplifications
DATA	
Synthesis	Describe criteria under which study data will be quantitatively synthesized
	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data, and methods of combining data from studies, including any planned exploration of consistency (e.g., I^2, Kendall's tau)

	If quantitative synthesis is not appropriate, describe the type of summary planned

Table 2. Preferred reporting items for systematic review protocol, adapted from PRISMA-P 2015 checklist.

2.1.1 Elegibility Criteria and Information Source

The following characteristics have been considered when carrying out the study: To start with the implementation of the SLR, at the moment of breaking down the research question, the PICO (population, intervention, comparison and outcome) model was used as a framework.

a. Transition on SE: PM and ITD approaches that potentiate, scientific database

Included on the report characteristics used as a criteria for the development of the review, it has been taken in consideration:

- Language of the publications: Different articles reported in English, Spanish and Italian were considered. Due to resource limits on the investigation, publications that were needed to be translated from other languages were not considered for the study;

- Year of publication: No restrictions. Studies were included without applying date restrictions, as information published at all times is useful for the analysis that is wanted to be carried out;

- Publication status: No restrictions;

- Study designs: Just records that are closely referred to the aims of the study were considered, mapping only cases in which what is being done regarding sustainability education transition is detailed, and the utilization of methods and tools under study exists on the documents.

- Excludable article types: Were not considered conference abstracts, correspondences, discussions, mini reviews, short communications;

- Geographical location: No restrictions applied.

Information Source: Bibliographic search strategies were developed for use in the electronic databases ScienceDirect, Emerald, Scopus, Google Scholar, ERIC and Scielo. The search strategy was limited to the English language, with the sole exception of the Scielo database, where Spanish terms were used.

b. Transition on SE: PM and ITD approaches that potentiate, Google search engine

Included on the report characteristics used as a criteria for the development of the review, it has been taken in consideration:

- Language of the publications: Different articles reported in English, Spanish and Italian were considered;
- Year of publication: No restrictions;
- Publication status: No restrictions;
- Study designs: Were just considered the first 10 entries, ordered by relevance;
- Searching keywords: “Sustainability Education” AND “Project Management” AND “Inter and Transdisciplinary”.
- Geographical location: No restrictions applied.

Information Source: Google search engine

2.1.2 **Search Strategy**

Based on the searching terms, different combinations were used between them, always pointing to meet information related to the investigation objectives. In this direction, all the terms were included on the different search engines and, as far as none result was found, terms were being cutted off from the searching bar. The different results are being showed on the ***Table 3*** schematized below.

Information Source	**Searching Terms**	**Combinations Used**	**Number of Articles**	**Date of Search**
Scopus	“Sustainability Education” - “Project Management” –	(TITLE-ABS-KEY ("sustainability education") AND TITLE-ABS-KEY ("project	1	31/3/2021

	“Inter and Transdisciplinary” – “Transformative Learning”.	management") AND TITLE-ABS- KEY ("interdisciplinary"))		
		(TITLE-ABS- KEY ("sustainability education")-AND-TITLE-ABS-KEY ("project management"))	15	
		(TITLE-ABS-KEY ("sustainability education") AND TITLE-ABS-KEY ("transformative learning"))	43	
ScienceDirect	“Sustainability Education” - “Project Management” – “Inter and Transdisciplinary” – “Transformative Learning”.	Keywords ("sustainability education" AND "project management")	54	02/4/2021
		Keywords ("sustainability education" AND "transformative learning")	71	
ERIC	“Sustainability Education” - “Project	Keywords (“sustainability education” AND "transformative learning")	38	03/4/2021

	Management" – "Inter and Transdisciplinary" – "Transformative Learning".	Keywords ("sustainability education" AND "project management")	11	
Scielo	"Sustainability Education" - "Project Management" – "Inter and Transdisciplinary" – "Transformative Learning".	Keywords (sustainability education AND project management)	19	03/4/2021
Google Scholar	"Sustainability Education" - "Project Management" – "Inter and Transdisciplinary" – "Transformative Learning".	Keywords ("sustainability education" AND "project management" AND "inter and transdisciplinary" AND "transformative learning")	35	03/4/2021

Google Search Engine	"Sustainability Education" - "Project Management" – "Inter and Transdisciplinary" – "Transformative Learning".	Keywords ("sustainability education" AND "project management" AND "inter and transdisciplinary" AND "transformative learning")	10	03/4/2021

Table 3. Search strategy used for each information source and results obtained.

Note: On the **Table 3** are showed the number of documents obtained on the search results before applying the selection process.

2.1.3 **Study Records**

a. Data Management

For data management, was used the reference management program Mendeley. After selecting the files manually, using as criteria the reading of the titles of the different files and selecting those that seemed most useful and related to the topic in question to facilitate the research, the selected publications were saved in the software by folders, dividing the files founded on each database, in this way was easier to find and classified the documents at the hour of reading the abstracts. Then, when it was time to read the full text, the pdf version of each of the publications was downloaded and managed with the software.

When writing this article, the same reference management software (Mendeley) was used for the citation of the different files used, so that each of the bibliographically referenced documents was included in the final stage of the research.

b. Selection Process

As a starting point, what was done was to search for the different key terms indicated above in relation to the research question, combining them according to the criteria used for the search. The articles that appeared were filtered in a first pre-selection, according to their title. Secondly, another filtering of the files was carried out by reading the abstracts and making a selection according to the inclusion criteria. The different criteria used on the inclusion/exclusion process was as indicated on the follow items:

a) Language: Records reported in English, Spanish and Italian were included and analysed in the process.

b) Title – abstract – keywords in which searching terms were included as a whole in the logical combinations used were analysed in the process.

c) Reports that are not accessible through Politecnico di Torino access were excluded from the process.

d) Papers in which the searching terms are not clearly defined and/or had not relation with the research goals were excluded from the process.

The flow chart (was used the PRISMA model) for performing the selection process in the scientific databases is presented in *Figure 5*. After the first search by criteria, a total of 297 records were found, which is the total sum of the files shown on the screen above (please see ***Table 3***). As described above, first, a selection by titles was performed: if the titles contained the words "Sustainability Education", "Project Management", "Transformative Learning", "Inter and Transdisciplinary" or logically related concepts, these articles were selected for a second filtering phase. Once all the files were selected, with a total of 63 remnant documents, they were uploaded to the reference management program: “Mendeley”, sorted in the different databases to which each one belongs: Science Direct: 20; Scopus: 22; Scielo: 2; Google Scholar: 10 and ERIC: 9. With the software, an initial check was performed with the "Check for Duplicates" tool, to eliminate those files that could be repeated in the preselection by scientific database. An alphabetical sorting of the files was then executed, and a second manual

check-up was performed to ensure that there were no duplicate files. This process eliminated 5 files, leaving a total of 58 entrances to continue with the selection.

For the next phase of the selection, the abstracts of the remaining files were read and reduced to 20 documents. As can be seen in the flow chart, a final selection of the remaining publications was made by reading the full text of the documents, thus and considering the objectives of the research, 5 final files were selected and downloaded, and with which we will continue the development of the analysis/research.

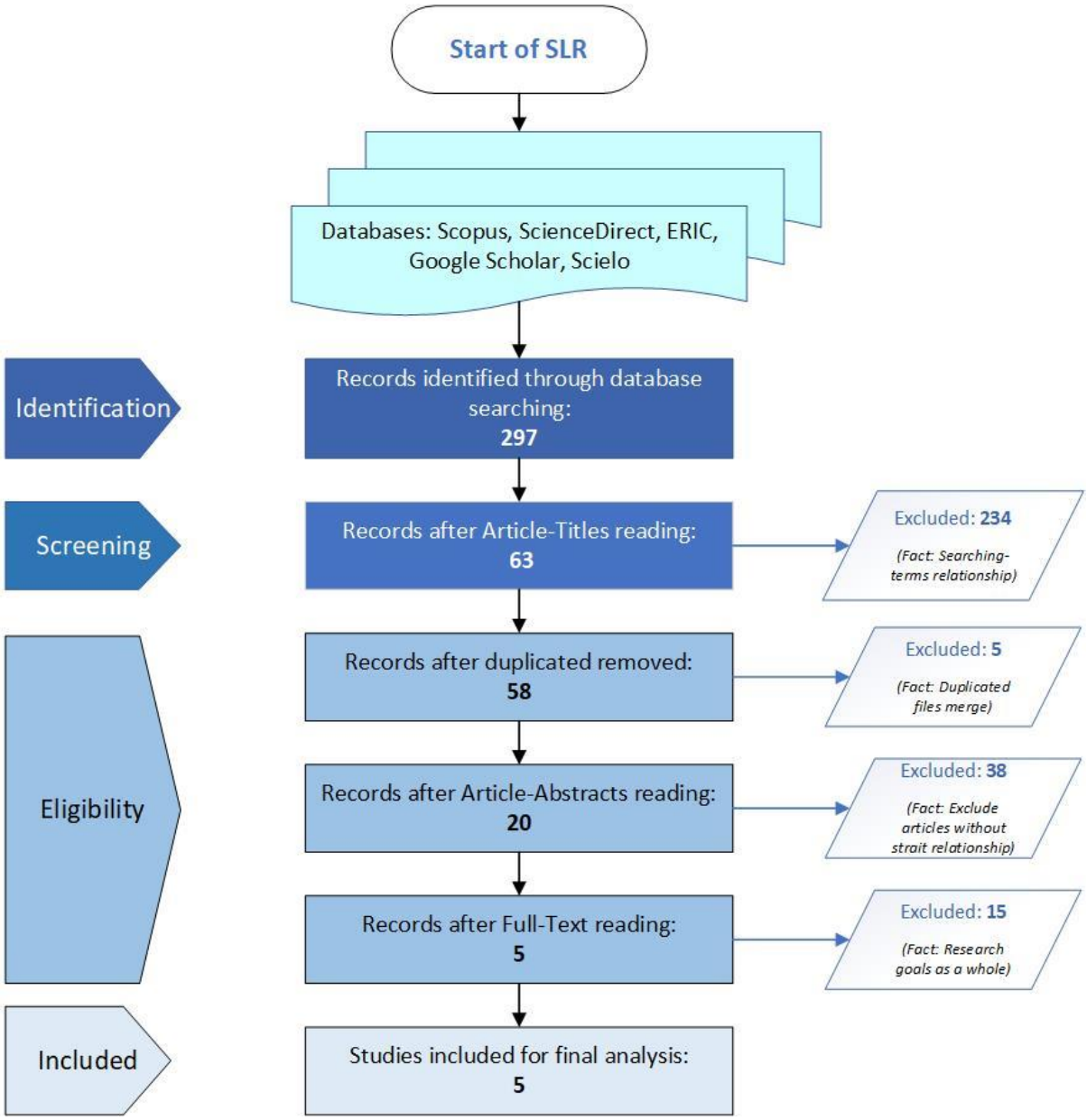

Figure 5. PRISMA Flowchart Diagram of the SLR

c. Data Collection Process and Data Items

For the realization of the SLR, data extraction was carried out independently for the author, and the process was developed following the checklist of the systematic review protocol from

PRISMA-P 2015 (see ***Table* 2**). Thusly is necessary to highlight that none double-check of the information extracted, or analysis was done by any other investigator, which leaves a major margin of error or misunderstandings on the results screened. It is possible here to emphasize the Karatzoglou´s quote, in which he makes reference to what is talked about before, expressing that "content analysis cannot elude the subjective understanding of the author and the explanation of certain findings and patterns" (Karatzoglou, 2013).

The data have been extracted following the objectives of the research, using the PICO elements (Participants/ population, Intervention/ indication, Comparator/ control, and Outcome) with which the research question has been formulated. In this direction we analysed the different theoretical methodologies that are proposed and the practical actions that are being carried out today in the field of transition to sustainability in education. Hence, contrasting and proposing how with the transdisciplinary project management tools detailed before and inserted on the investigation, it is possible to enhance it.

2.1.4 Data Synthesis

The criteria used for the synthesis of the study data used for the investigation was to extracting information applying a common analytical framework which allows to integrate and screening the information in a standardized way, and with a coherent and consistent systematic narrative synthesis. The exposition of the data is presented in format of text, tables, graphics and figures as is following showed.

Each record included on the analysis was used for juicing the following common information, that responds to the objectives aimed as was highlighted on the investigation goals´ section:

a. Title, author and year of publication;

b. Goal of the document;

c. Geographical context;

d. Conclusion and results.

On the other hand, just for the records included on the final analysis after the whole selection, whenever possible, the following information was extracted:

a. Methods and tools applied;

b. Theorical and practical differentiation of the methods;

c. Inclusion of searched tools (project management – transdisciplinary assessment);

d. Kind of institutions studied;

e. Data sources.

Extracted information pass all through an exploration of consistency guided for the author, among the terms related to the research, underlighting their relevance on the incorporation that makes place in this thesis project.

2.2 TrUST project's material analysis

The material collected and organized from the interviews was then subjected to a “Interpretative phenomenological study with a project management approach”.

Interpretative phenomenological analysis is a qualitative research approach that seeks to understand the meanings associated with lived experience. to understand the meanings associated with lived experience. It is now widely recognised and widely used” (Duque & Aristizábal Díaz-Granados, 2019). In this way, integrating a PM

approach as a lens for the vision of the study, the analysis of each of the interviews is carried out, seeking to bring to light the aspects that concern the objective of the study, and in this way to use them later in the creation of practical solutions when carrying out useful systemic changes in the analysed environment.

In order to carry out the analysis, the author's previous and recently acquired knowledge is considered, which is used as a filter when interpreting and inducing what the different interviews reveal about the aspects to be studied. Thus, one by one, the interviews are studied, with an analysis being made of each of the sections in which the subjects were questioned, and this differentiation is used for future conclusions. It should be noted that questions belonging to some sections have not been included in the analysis for one of the following reasons:

- they have not been answered in the interview,

- they do not provide relevant information for the analysis,

- they were joined with other answers, from which the same conclusions can be drawn.

We must stop allowing issues that affect all of us to be seen in an esoteric way, we are living in an era in which it is necessary to generate higher levels of awareness in society, in order to generate a transition to a more sustainable world for both our planet and ourselves.

Perform an individualistic analysis, taking into account what has been said by each of the authors individually on the subject discussed initially and that bring them all together (ID/TD), with a perspective focused on Project management, in order to try to highlight the aspects that stand out on the discipline that is used as a magnifying glass for the analysis. In addition, a holistic analysis of the whole system is carried out, the conclusions will reveal how PM influences the system studied and will clearly highlight the technologies and tools that will be useful for the pursuit of the transition in sustainability that we are interested in knowing.

2.3 Academies of Companies

In terms of development towards an education in sustainability, it is necessary to contemplate the existing relationship with the environment, equitable distribution, participation, interculturality, creativity, self-realization, cultural autonomy and even spiritual aspects (Gutiérrez Barba & Martínez Rodríguez, 2010). It is essential for companies to be able to adapt to the digital transformation that is occurring today and to evolve in all the aspects that were raised above. To generate this adaptation successfully, it is necessary to focus on three fundamental aspects: technology, processes and people. Intertwining the concepts with the study that was carried out previously with respect to the analysis, using Theory U, of the TrUST project material, we will address in this section the importance of the person, and as Scharmer says (O. Scharmer, 2018) the role that each person plays in the belief that "who believes that changing the world is connected with changing yourself".

Nowadays, thanks to the profound technological changes that affect all spheres, there is more and more diversification in the tasks that are performed, and that each employee needs to fulfil. The activities are more specific for each of the positions that different companies, in different sectors, need to accomplish. This is why changes are sought in the curricula of educational systems, to cover the gap that exists between the competencies that students acquire during the course of their academic training, and the needs that companies have. Companies need profiles that adapt to the new labour reality.

Companies are, in comparison, much more versatile than public institutions (ministries, universities, etc.), which allows them to have the capacity to read and respond to changes with a wide repertoire of complementary skills and behaviours. In this way, the aim is to foresee situations to which one must adapt in order to deal with the uncertainty and complexity that arise, broadening one's perspective on the environment, understanding the tools that one has and those that are lacking, and developing the necessary skills for this.

CHAPTER 3: RESULTS

3.1 Interviews Analysis Results

Based on the author's previous knowledge of Project Management, plus the bibliographic search in multiple sources for new information to update the previous knowledge, plus the reading of different articles referring to the topics under discussion.

The systematic review of the literature has been of enormous help in generating a greater level of knowledge and awareness about the relationship between key terms for the analysis, which has allowed a greater level of consciousness to be acquired about the interrelationship that exists, in order to carry out an accurate analysis, with a viewpoint based on knowledge and professionalism, and helping to close and create a bridge in the existing convergence between the concepts analysed.

Following the structure with which the interviews were carried out, see **Table *4***, the results of the inductive analysis with a phenomenological interpretation are obtained, corresponding to each of the participants, sections and questions asked.

Section 1	**Definition**
1.1. Would you define your education activity as ID/TD? If so, why?	
1.2. Which SDGs you can map your activity on?	
Section 2	**Implementation**
2.1. How do you make ID/TD Education happen?	
2.2. Which methods, tools and tricks, team building you put in place?	

2.3. Do you have prior experience in working in this way?	
2.4. If yes, did you take learnings from those earlier experiences?	
Section 3	**Obstacles**
3.1. What are the barriers you encountered in ID/TD work in education?	
3.2. Could you tell us examples in which these barriers made a project/an action fail?	
Section 4	**Trigger/ Enabler**
4.1. What could be a trigger/enable ID/TD education for a sustainable urban transformation?	
4.2. Could you tell us a story about your case of success?	
4.3. Could you tell us a story about your case of failure?	

Table 4. Interviews' question's structure

Participant 1: A.D.

Research Centre: CENSE

https://www.cense.fct.unl.pt/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The participant self-defines her activity as interdisciplinary (ID) by "combining knowledge from different disciplines, and making participants aware of these connections and trying to discover new connections and learn about the different influences and impacts on the system", and on the other hand, she seeks to bring her work as transdisciplinary (TD), integrating different social roles (non-academic, citizens) in the process, thus broadening her range of stakeholder categories and on the other way, being aware that this integration contributes to the benefit of bringing sustainable change in the whole system.

Adhering to the above, the transformation towards beginning to see and feel the system, infers the possibility to enhance the work being done in even more sustainable terms.

Section 2. Implementation

3: How do you make ID/TD Education happen?

The interviewee defines in this question that her way of making ID/TD education happen is through "courses on co-creation and collaborative methods, integrating students from different disciplines". For the development of such activities the insertion of an approach such as collaborative/ inclusive leadership is fundamental, in cases, the inclusive leader must be able to grasp nature and basic human processes in order to know the potential and limits of social change, this recognises the need to include the necessities and realise the situations that others are going through in order to generate a good leadership relationship. The interaction with the different levels must be born from each party's personal and social profile, to be able to face the complexity and uncertainty of today's systems.

4: Which methods, tools and tricks, team building you put in place?

When referring to the creation of teams and the implementation of different tactics to achieve this, the answer lies in key points that match exactly with the stages

that a project manager can follow in the creation and formulation of a project. In comparison, we contrast "Setting up shared group principles / rules" with the definition of objectives, roles and tasks that are faced in projects, in both cases the aim is to eliminate conflicts that may arise between peers and generate a friendly working environment, in order to avoid conflict between roles and participants, so as not to decrease productivity.

On the other hand, the human systems of collaboration and co-creation is a tool that is unconsciously generating and contributing much more than the participant reflects. In projects, co-creation fosters the proactive engagement of clients in the different phases of the project lifecycle and contributes to the success of the project. It seeks to generate an impact on this system (team building, human system) by creating a feeling of each participant as the centre of the team, who are and maintain the core. There must be a certain level of energy and commitment that can be felt together. There has to be competence, members have to be knowledgeable about the topic they are going to work on. Seek commitment from experts to focus on the issue through collaboration among participants and recognition of opportunities for measurable impact.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

When it comes to barriers, the interviewee seems to be clear about multiple reasons that limit work on ID/TD in education. On one hand the lack of resources is mentioned, which is a common weakness in a large portion of the institutions and is difficult to deal with. On the other hand, reference is made to the lack of a curriculum plan that includes this transition in sustainability education in greater depth. Finally, reference is made to the human resources, which, in their different roles, do not contribute to the facilitation of this transition. As an identification of some of these problems, we see that the interviewee refers to "colleagues" in her work environment,

without referring at any time to training or teamwork (which is a basic competence to implement when generating a transition plan of this type) and highlights the lack of support staff for the development of activities. Analysing these aspects from the point of view of the 10 areas of project management knowledge, we can extrapolate this situation to the area of resource allocation, which would be a very useful tool for managing available resources and planning the work to be carried out in the future following the guidelines set out in the PMBoK. In this way a greater commitment can be created with the participants in discussion.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

As far as triggers/enablers are concerned, it would be interesting to include, as the interviewee points out, situations of challenge in which people, as Scharmer explains in the U-theory, come to connect with The Source. Descending through this U that he proposes, to the point of Presencing, in which they "connect with the world that emerges from within". The triggers for such a condition, as they are well posited, generate a commitment and a change in the person who seeks to engage in this transition. William O'Brien, the former CEO of the Hanover Insurance Company, has summarised his experiences in leading change as follows: "The success of an intervention depends on the inner condition of the intervenor" (O. Scharmer, 2000). The reference here is to the fact that the success of a tangible event, such as the issue in question, depends on the intangible "inner condition" of the intervenors in question.

However, not only this is necessary for the successful transition to a system-wide approach to sustainability education, but also the formulation of concrete projects, in which all stakeholders (schools, governments, society, etc.) are involved, is necessary. These will be used as drivers towards the generation of value for change.

Participant 2: C.V.

Research Centre: Istituto per la Ricerca Sociale (IRS)

https://www.irsonline.it/it

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

In this first section, the person of interest defines and contrasts her activities as inter- and transdisciplinary (ITD), differentiating between the two, and giving examples of particular cases such as projects developed in the different ways. It can be seen that the work done is very project oriented, in the comments on ITD, the use of PM strategies such as the stakeholders' involvement, making different stakeholders participate in decision making and the contribution of experiences that affect and/or are affected by the ecosystem's service can be discovered. In an unconscious way, the interviewee highlights different levels of stakeholder engagement. Would be important and really useful to develop some analysis about them, for example creating a Stakeholder Engagement Assessment Matrix, in which the different stakeholders are classified (i.e. unaware, resistant, neutral, supportive, and leading), and their power and interests are also analysed to know how to manage to each of them.

Section 2. Implementation

3: How do you make ID/TD Education happen?

In what regards in making ID/TD education happen, the author resorts to a logical sequence of steps applied to the specific projects she carries out: "applied research, evaluation, training, technical assistance on specific issues", furthermore as a remarkable point, reference is made to the exchange with external actors, not only within, but also outside the own formal working environment, which can be interpreted

as a real connection of the one(s) involved in the development of these projects to the projects. It is interpreted as them descending into connecting with the world outside their work bubble, towards the so-called bottom of the U, and thus beginning to connect with their inner selves, a step that prepares the participants to rise through the other side of the U, "bringing forth the new into the world".

A simple disconnection from the standards set by the current model draws attention to this transition to a new world, a more sustainable world, and is worthy of being analysed and highlighted in order to generate greater awareness for its use.

4: Which methods, tools and tricks, team building you put in place?

In this section, the interviewee refers to the creation of interdisciplinary teams, commenting that in their activities they carry out collaborative work in the project teams formed, so that they are able to "look at a problem with different lens", "mixed advisory board" are formed based on the project objectives. With regard to the functioning of the teams, many valuable team building techniques are described, which contribute to team building. For the work that is done, it is proposed as inclusion of an agile methodology such as Scrum, which is one of the agile frameworks for project management, for an optimisation in the organisation of the teams and to generate an optimisation in the objectives, in order to offer greater value in the shortest possible time. This, by analysing the work being done in the research centre, can provide greater value generation in each of the teams in the different locations of the centre.

As far as the transdisciplinary aspect is concerned, the implementation of agile methodologies, as mentioned above, is very useful, as practices are carried out in which the different stakeholders are involved, taking on the role and being able to extrapolate the situations that appear in the iteration as a result of the application of the methodology, and being able to manage, anticipate and adapt to the challenges. In this way, it is possible to analyse and understand how to better engage certain stakeholders involved in the projects, which are often more difficult to capture as such. It is also

important to stress that the involvement of agile methodologies is not easy, it needs the commitment of all parties involved, and to develop the knowledge for such implementation, studying the steps and methodologies to be adapted in the work to be developed. Otherwise, the organisation (or the project to be developed) can become a chaos, in which the participants end up disoriented due to lack of experience, lack of someone to guide the implementation in a correct way, who does not have enough capacity to detect the quality in the development of the activity, and the final product.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

In this section, reference is made mainly to problems arising from ID/TD work that have not yet been overcome by multiple institutions, organisations, etc., for instance communication problems (due to the use of different languages) are highlighted, without generating even the consensus of a common understanding. The interviewee also refers to the mistrust that exists between participants of different disciplines on the one hand, and between the participants and themselves on the other hand. Soft skills are a turning point in team building and in the successful development of a project. The points discussed above invite us to think about where we should put the focus of our training intentions, so that the transition to sustainability education really happens, and if we do not start to change by people as actors and generators of the desired change, leading deep change in them, it will be very difficult to reach a successful outcome. Today, Theory U is seen as a way of being - connecting to the more authentic of higher aspects of our self, which helps to develop people's awareness of the systems in which they interact, in that way, tools like Shadowing, already developed in Theory U contents, would be useful to apply.

8: Could you tell us examples in which these barriers made a project/an action fail?

It is worth highlighting this case example, in which the author refers to the lack of capacity of some teachers (a generalisation is made to the case of teachers of hard

disciplines) to generate a work of co-creation. Here she manages to bring to light how professionals sometimes remain in their field of action, in their own discipline, and believe that the disciplines are framed in the development of the professional who has dedicated himself to it, so they must be the experts in the creation of certain contents, and this makes it difficult to create in an iterative and interactive way. The interviewee rightly describes how certain teachers "perceive" a lack of knowledge in the experts, and this generates an impossibility in the implementation of this new approach. A paradigm shift to the possibility of doing work in which we can understand how each point of view can enhance the desired outcomes and perspective towards a more sustainable world is fundamental, using agile management tools as transition from external to internal management teams, in which the team is self-managed and self-organized, where only the most serious matters are escalated outside of the team.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

The interviewee refers to the fact that "urban sustainability does not refer to a single issue (mobility, energy, inclusion, etc.), but its complexity requires intertwined knowledge in various fields" and points to the intertwining of activities "since one action can have an impact (positive or negative) on the others". This is closely related to the implementation of effective project management in order to achieve better results. To make the above explicit, following the pre-planned stages as a guide to follow the development of a project, generates that the roles are well defined, the interactions between profiles performs as an enhancer and not as a barrier. And as Slow Agile talks about, the prioritisation of human relations, learning through the generation of short tasks with concrete objectives, and as indicated in the interview, for this is necessary making the students the decisive actors in the act of learning, and not just receivers of information.

As a final point to highlight, the interview refers to the "recognition of different competences to create more sustainable societies and citizens", which must be worked on through an approach in which the citizen is made aware (seeing and sensing) of the environment of which he/she is a part and is committed to the creation of this more sustainable society, disseminating what he/she has learnt.

Participant 3: D.F.

Research Centre: Universitat Politecnica de Catalunya

https://www.upc.edu/ca

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The role that one has at the *organizational level* is a factor that contributes to the person, to be able to be a *generator of change*, this is why it can be seen how the interviewee in question applies from his role, tools such as the use of *networking* for the *involvement of stakeholders* in the project that contribute to the better development of the same and generate this work ID / TD for the co-creation of knowledge. Theory U is about paying attention to these interconnections and emergence as the basis for deep change and innovation.

On the other hand, the subject in question refers to "challenge-based education processes", like the previous interviewee, seeking to make students take the lead as active characters in the learning process, and inserting a *higher level of motivation in the system* to be transformed by applying motivational methods like as: McGregor's Theory X and Theory Y; Herzberg's KITA Motivation; McClelland Achievement, Affiliation, & Power Motivation.

Section 2. Implementation

3: How do you make ID/TD Education happen?

We all agree that *networking* for work is an agreement that we must consider and generate for the success of any project. However, in project management, it is not a key point of analysis for the realization of projects since it is done in a previous phase and the networks of the organization or particular people are used (outside the specific project in management time). In any case, it is necessary to emphasize the reference to the *involvement of "people who share a common purpose or mission*", in this case to analyse the stakeholders in question, from those who finance the project, those who manage and develop it, to the end users who receive the derivable. In this way, it is possible to *prioritize them*, knowing their *interest and power in the project*, understand the role of each one and obtain higher quality, more efficient results.

4: Which methods, tools and tricks, team building you put in place?

5: Do you have prior experience in working in this way?

The interviewee clearly points out a stretch *relationship existing among sustainability education and the use of project management tools*. Regarding methods, tools and tricks, he highlights specific points (*design thinking, agile methodologies, U-theory, mixing art-science*) some of them there were already discussed previously, as *challenge-based education* (he makes reference to the *learning-by-doing method*) as the only way to deliver sustainability, and from my point of view this is right, there is no other way to make this transition than putting or make them to take place as *change-makers* in the transition to a more sustainable world.

6: If yes, did you take learnings from those earlier experiences?

Is also remarkable when he talks about acquired experience, the *external work with other kind of organizations* (as a non-profit cooperative), makes *people gaining*

experiences that are *completely different* from daily environments, giving the possibility of generating in each person, different points of view, enraptured by their previous experiences.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

In the section on obstacles, emphasis is placed on different sections that can be classified and grouped as follows:

- *obstacles at the institutional level* (bureaucracy, lack of funding);
- *interpersonal problems* (competitiveness, communication problems);
- *human weaknesses* (lack of skills and knowledge).

8: Could you tell us examples in which these barriers made a project/an action fail?

It is necessary to be able to *train* and really *engage all the actors* necessary for the generation of the transition, because otherwise, it is impossible to *transform the system* established in place, would be priority to make it the focus and take it as a priority, and not let it as an *"extra content*", as the subject comments on his experience, and that should be happening worldwide. Scharmer describes it clearly and gives food for thought on the implementation of methodologies to achieve these ambitions:

1. You cannot understand a system *unless you change it*. (Lewis)
2. You cannot change a system *unless you transform consciousness*.
3. You cannot transform consciousness *unless you make a system see and sense itself*.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

This section refers again to *training*, to the *creation of knowledge* and the *definition of concrete roles*. In this particular case, it is proposed the training of people in TD, as *facilitator figures* in universities, to allow the articulation with the outside world. It is proposed that these roles be "fundamental requirements" in (European) universities, which generates an obligation in the establishment of a role that would be key in the development of the necessary activities in HEIs to *ensure the transition to sustainable education*. It would be interesting from the world of PM, to *include capabilities* that project managers acquire to play these roles, since the necessary skills for the situation raised above, are similar to those for which they are trained today (*leadership, organization, negotiation, etc*.). In addition to what is traditionally seen as PM skills such as those mentioned above, leadership training should have an approach like that of *Theory U for Leadership Capacities*, since the journey through the U develops seven essential leadership capacities: 1. Holding the space of listening; 2. It could raise up the leaders of the future that are needed today.

Participant 4: E.O.

Research Centre: University of Gothenburg

https://www.gu.se/en

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The interviewee puts more emphasis on courses, programs, and participations in topics related to sustainable development, how to work to achieve the SDGs, and in the meantime he highlights points about ITD, such as the "integration of different perspectives", "multidimensional programs", where *transdisciplinary research (TR) is*

integrated, used *to solve social challenges, facing complex problems* such as *social, environmental, spiritual*, integrating the *different social actors* (divided into classes, sectors, and with particular roles), and complementing with our collective capacity since "this era requires a new consciousness and a new capacity of *collective leadership* to face the challenges in a more conscious, intentional and strategic way" (O. Scharmer, 2008). It is necessary to *orientate educational personnel in the direction of seeing and sensing the system*, because if they as educators do not do it, will not be possible to transmit this to the students, even though the *educational programs* and *curricula changes*.

Section 2. Implementation

3: How do you make ID/TD Education happen?

4: Which methods, tools and tricks, team building you put in place?

As far as implementation is concerned, the interviewee closely relates the ways in which he refers to how to make IT/TD education happen, and the methods, tools and tricks he uses to achieve team building. On one hand, he refers to the *involvement and intertwining of people belonging to different disciplines*, and to different stakeholders; the treatment of this "political" environment by *all those who have an interest in the outcome of the project* is not easy to manage, whatever the type of activity. It is therefore necessary the inclusion of known management tools, in which we have skilled people, to make the most of these practices.

Elsewhere, the interviewee refers to the use of more personally *holistic methods* than the more frequently mentioned hard methodologies. He refers to asking students questions such as: "*What is the meaning of life*?" and "*What makes you happy*?"; this seeks to *transform the quality of awareness and attention that people apply to their actions within the systems*, both individually and collectively, to seek to *transform the behaviour of the educational system*, and as the interviewee says, to see how it supports the purposes being sought.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

In particular, the interviewee refers to the existing *human relations* among peers (teachers), which apparently have not generated good relations, which is key for the good performance of any activity. As he says, "Do not have to love each other, but you have to respect one and other", and even it is not enough for the building of a work team, but those are the fundamental bases to create in order to move forward. From PM some techniques and tools could be integrated as the *Tuckman Team Development Model*, in which different stages for the group development are settled, in order for a team to grow, face up to challenges, tackle problems, find solutions, plan work, and deliver results.

Secondly, it refers to *administrative barriers*, which generate detachment in the empowerment of the project between entities (faculties, universities, etc.), being a key piece in what we are referring to sustainability: *SDG 17 -Partnership for the goals-*. For this it is necessary to *induce the authorities* of the university, and/or those who have power at the time of making decisions, so that they get involved and see the importance of being able to carry out this type of activities, making them leave the current model that they have about the system, and make them become *agents of change* by their own convictions.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

The interviewee talks about the importance of *generating the time/space for discussion* about what is basically being done in terms of education, with the aim of

generate *real awareness* of the system in which the participants are involved, and to generate applicable *transformative learning* to change the system as a whole from *The Structure to The Source*.

Participant 5: J.F.

Research Centre: La Trobe University

https://www.latrobe.edu.au/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

In this introductory section, the interviewee refers to the *work with various disciplinary areas and knowing* that it is carried out in this way, in a *conscious way*, it is assumed that it is known what it is intended to achieve, analogously to the planning in organizations for the development of their activities. Multiple disciplines are intertwined to work towards a common goal.

Section 2. Implementation

3: How do you make ID/TD Education happen?

In terms of implementation, the interviewee refers to the use of "*different perspectives*" in order to *build "understandings of complexity*". Going a little further, we know that today we are in an era where we must face complex social, institutional, and personal problems, which means that we must approach them from multiple aspects in order to generate the desired transformation. To depict from Theory U, it is necessary to be able to *differentiate the levels and sectors of the omnipresent complexity* with

which we deal, differentiating social and institutional complexity that represent a problem of interests, from the dynamic complexity that does not allow us to determine exactly which factors and actors play a specific role.

4: Which methods, tools and tricks, team building you put in place?

Reference is also made to the *inquiry-based learning model*: "Inquiry is the process of using the intellectual students in acquiring knowledge in how to find and organize the concepts and principles into an order of importance according to the student. Inquiry does not only develop intellectual abilities but all potential students, including the emotional and also skills development" (Andrini, 2016). It would be very interesting to make an approach to the development of this type of teaching in an *empirical way* in the classroom, in order to enhance what was previously discussed about the *generation of change-makers*, from the different *strategies established by the institutions*.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

Once again, we can clearly see how the *interest of the different actors* involved in the development of the activities changes and perhaps *is not enough to generate the commitment that is needed* on the part of each one to carry out the proposed changes.

Therefore, it is important to be able to *engage with people who are really interested in generating this transition*, who are not afraid of change (an issue that is not difficult to face today, especially in people or groups that are very comfortable in the situation in which they find themselves). In this way, by *bringing together actors who have the capacity and audacity to tackle this journey*, it is possible to start working on this change in a *structural way* in the institutions, committing authorities and people

with the power to carry it out, convincing them that it is necessary, and giving them the necessary tools to be able to carry it out. When *managing stakeholders*, it is necessary to keep them informed, for which you can use the bases of *PMI standards and best practices*, which raises a proper *management of portfolios*, integrated with *business intelligence* to finally perform a *monitoring of portfolios*, generating automated processes of analysis and control (Price, 2007).

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

It is very interesting to see how the interviewee poses as triggers and enablers, something that the market is realizing is not working, and is no longer willing to pay for it. The *current type of education* (the old school, literally), is no longer being accepted in terms of sustainability by people, a *paradigm shift* is needed to *face the complexity and uncertainty* that we have to deal with today and allow to adapt the "customers" of the market to it.

In addition, the *integration of education with a look at the transition stage towards professional life*, in the business sector, also makes it possible to make a change towards this transition, *providing information on the skills needed by the new professionals of this new era*, and thus be able to give them the necessary tools to leave better prepared to face the real world, with innovative leadership skills, which lead to adaptation and change of organizational culture.

Participant 6: J.D.

Research Centre: Former QOT

https://learninghub.earlychildhoodaustralia.org.au/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The interviewee, in terms of defining his activity, refers to the fact that "they do not have the freedom to do transdisciplinary work all the time", so again there are *administrative barriers* from the institutions, and the solution is the same as previously stated, to *attack at the highest level* of those who have the *power to make decisions*, and in a reasoned way, to show that the system today is asking for a *change in the way of delivering knowledge*, that a more transformative way of learning is needed, and therefore to include in the plans subjects, techniques, methodologies, etc., that indicate an education in transdisciplinarity, and therefore to include in the plans subjects, techniques, methodologies, etc., that indicate an education in transdisciplinarity. That *induce an education in sustainability committing all the parts belonging to the system.*

When we talk about inducing the authorities about the need for this change, we must also contemplate the need for them to have justification at the time of making the necessary changes. Therefore, techniques such as the *inclusion of performance reports* can work in generating this change of perspective in those who have the power to make decisions. The final result, the success of a project, is closely related to the performance of the activities. Some of the reports normally included are: *Progress report, Status report, Forecast report, among others.*

Section 2. Implementation

3: How do you make ID/TD Education happen?

As indicated by the participant, there is a *pre-established structure in the systems*, which makes it difficult to approach change by introducing new innovative/disruptive proposals that are well seen and accepted. Therefore, we propose

the insertion of these new forms, *leveraging the system* where it leaves small holes to get involved in what we are looking for. To clarify this, it is mentioned that institutions nowadays label issues related to sustainability, *critical thinking*, use of *system thinking*, etc. by these betas, we can introduce forms of transformative teaching that allow to develop to the maximum the *personal skills of students*, forming them as protagonists and giving them the ability to develop in all kinds of scenarios that they will face in the future.

4: Which methods, tools and tricks, team building you put in place?

The use of techniques such as "common/shared concerns" of the stakeholders, "networking", "system change", "use of *collaborative/inclusive leadership*", is a formulation that is made in terms of the transition of training through problem solving in which the questions presented to the students refer to inductivist conceptions that allows the student to the possibility of reviewing their conceptions and above all to make decisions about which path to follow, which as a consequence gives rise to reflective processes and the formulation of hypotheses (Coronel & Curotto, 2008). In this way, working groups are also formed, enhancing teamwork techniques, increasing the perspectives on a particular challenge, and leadership capacities are also used and formed in the students.

5: Do you have prior experience in working in this way?

6: If yes, did you take learnings from those earlier experiences?

As a quick conclusion about the experiences lived with regard to the ID/TD work, the interviewee expresses the importance of the *human relationship* and the *capabilities of those who work to achieve these objectives*, and how to maintain *motivation* in the face of such challenges that make it difficult to keep going when things get ugly. For this reason, the use of *techniques theorized and proven in practice such as McClelland's Theory of the Three Needs*, *Herzberg's Bifactor Theory, Vroom's Expectation Theory, Maslow's Theory of Human Needs, among others*, is proposed to

maintain motivation, which is the driving force that leads individuals to carry out activities, goals that are sought.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

First of all, the subject refers to the *economic problem* for the development of the activities, which is not an influence of the case as explained (it would be if it were the implementation of new perspectives for education). And there is also the issue of the *partial time available to teachers* for the development of such activities, which hinders their commitment to the project. This approach can happen as a reality, but as mentioned above, it is necessary that the *system works from its core in this way*, and not the inclusion of peripheral activities that try to work as such. This would avoid the problem raised.

8: Could you tell us examples in which these barriers made a project/an action fail?

The problem of *maintaining the activity for a prolonged period* is again highlighted, and the interviewee comments "The idea of the difficulties caused a level of self-censorship", so we return to the approach of making the *transition as the central activity* in the institutions, involving the necessary actors for this and providing the conditions for this to happen (in terms of personnel, budget, infrastructure, etc.).

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

10: Could you tell us a story about your case of success?

The example given by the interviewee in practice, clearly shows how, even from a long time ago (example of the '90s), as human beings we have almost the *instinct to*

solve the problems that arise, by this I mean, how the problem can be the trigger to generate a solution, reaching a port as a better situation than the one we live in today/ in the past. Then, we can change the way of seeing the challenges that arise in the day to day and *begin to see them as a need for change towards something better*. This is how we can change our perspective and perception regarding the events we face, and with *transformative tools* such as those we have been naming (development of *leadership capacities, design thinking, systematic innovation, agile methodologies*, etc.), address the challenges beyond the problem we see, and be able to generate that change in us and for society.

Participant 7: K.M.

Research Centre: University of Delft

https://www.tudelft.nl/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The approach to education in terms of an ID/TD activity can be very broad, as stated by the interviewee. It is taken into account that *social structures reflect the differences of capitals existing in a society* or social group, this involves cultural, economic, class, gender, ethnic, etc. issues. The proposal of an *educational model* in which the *various actors are connected* and *can become aware of the position in which they find themselves*, *the role they should play* and *the ambition to train the protagonists of change*, can be very enriching in terms of the transformation sought towards a more sustainable society.

Section 2. Implementation

3: How do you make ID/TD Education happen?

4: Which methods, tools and tricks, team building you put in place?

In relation to implementation, the use of *problem-based learning*, this *collaborative approach* that seeks to train students by *solving complex, real-life problems*, is once again highlighted. Instead of just trying to "absorb" information, *students seek to teach themselves*. In this way, it is possible for students to realise what they know about the subject matter, to bring to the fore the knowledge gaps that exist and to fill them in further education. Thus, the application of methodologies such as this one, together with the variation with others such as project-based learning and the use of tools like *critical/strategic/analysis- thinking, stakeholder involvement* will, together with a *target-oriented plan*, instil our future leaders with this new educational paradigm with the necessary skills for their involvement in today's world of work.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

As far as barriers are concerned, points that have already been highlighted by other participants from different research centres are repeated again, so they begin to have a higher tone. On one side we have the "*lack of competences*" to carry out this kind of work, so it is necessary, as mentioned above, the *training of personnel* who can develop such activities. It is also spoke again of the *lack of relationships between peers*, therefore *human relationships* that do not conform a work team and involve people who even have no interest in generating it, which greatly hinders the development of the activities. *Organizational/ management problems* also reappear on the part of the institution, hampering the possibility of generating stimulating actions for the transition.

On the other hand, the importance of the *involvement and engagement of stakeholders* is also recognized from another perspective, highlighting how "non-scientists" are not given the necessary interest in research projects from the core of them.

Last but not least, it is important to bring up again the appearance of the consideration of *courses of this type as complementary* ("add on"), and the *lack of recognition* of their importance, which generates difficulties in the development of these activities.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

10: Could you tell us a story about your case of success?

The interviewee, in terms of triggers/enablers, refers to some points already mentioned by others, such as the fact of *generating practical learning*, and leaving a little more aside the theory, i.e., that this not be the core of learning, so that *skills necessary for the development of a more sustainable society* can be acquired by applying the practice, that is the way in which people really can soak up on the learning pretended to be transmitted.

On the other hand, and very remarkable is the *appointment of external recognition for the activities carried out* (symbolic or even monetary), which are a very *strong incentive* for the development of new activities such as those of this type which are looking for be inserted on the day-to-day in education.

Participant 8: L.L.

Research Centre: Politecnico di Torino

https://www.polito.it/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The following interview is conducted with a master's student, whose contributions are valuable to obtain a *different point of view* from the rest of the interviewees. In this first section, reference is made to *working together with people with different backgrounds and learning about ID/TD*, introducing this as a common practice in the *learning process* and extrapolating the procedure to cover the *need for experience on the subject in terms of project development in the professional environment*.

Section 2. Implementation

3: How do you make ID/TD Education happen?

4: Which methods, tools and tricks, team building you put in place?

The solution that is proposed to leverage all these problems must be *coordinated and agreed* by the *different stakeholders*, people who are agents of change and make this implementation at all levels, not only at the high educational level, but generate change from the root (*The Source*), to involve people, to understand the problem, go through the process of internalizing, dive on situations, how it is *affecting their own person, and their environment*, to thus emerge at the conscious level and be able to be able to be a tool for change.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

The analysis in the following interview is interesting, since the subject speaks in first person of how his training has been (in very recent times), and therefore reflects *what the university is doing*, the way in which it is working and educating. She talks about the generation of a *silo way of thinking*, which generates an enormous barrier when trying to create a *collaborative work* with people from other disciplines, with knowledge different from that acquired in our field, and it is an extra step to be able to generate the ability to value this.

On the other hand, the *lack of practice in the learning process* is mentioned one more time, being that the theory takes completely the lead in this career for which we are fighting and leaves the students as mere receivers of information on a bench, a chair and between 4 walls.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

A hitherto unmentioned aspect that takes the form of a trigger/enabler and is really a key element in the generation of confidence on the part of third-party institutions in the cause pursued, is the clear diagram and dissemination of *success stories*, which will undoubtedly serve as an *incentive for the key decision makers* to apply the necessary changes to pursue this objective.

As another key point in this section are the *incentives* (reward, recognition, funding) which are highlighted with the need to use them as an engine to increase the engagement of the people involved.

11: Could you tell us a story about your case of failure?

The impossibility of working together is interpreted and considered as a case of failure, as the distrust of one professional in another (*human relations work with different training*) with a similar training in terms of the implementation of a project in a certain way makes the project itself cannot reach a successful outcome and / or does not *generate a synergy between the capabilities of both professionals*, in order to promote the achievement of a much better result.

Participant 9: L.C.

Research Centre: Universitat Internacional de Catalunya

https://www.uic.es/es

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

In this first section, the interviewee refers to his activity as Multi and Interdisciplinary (MD/ID), without having yet been able to develop his activities transdisciplinarily, which is important to differentiate to be clear about the paths and decisions to take in the direction of this type of practice.

Emphasis is placed on the delivery of *workshops*, where a form of ID work is really encouraged. *Educational workshops* are an active teaching process, whose organization and development are focused on student learning, being this the protagonist and in charge of it. By generating these workshops in an organized and planned way, directed to the desired change, and including the tools that stand out as necessary, it will be possible to address the problems we are currently facing in a more sustainable way as it is sought.

Section 2. Implementation

3: How do you make ID/TD Education happen?

The interviewee emphasizes again the importance of *workshops* in the development of ID activities, but also the involvement of teachers "from different countries, centres, from different fields to teach", is a very valuable strategy for the *interaction between institutions*, the generation of *new alliances* that are linked to the exchange of knowledge and the generation of a more complex training for students. Furthermore, with respect to TD work (referring to the implementation of projects), the *experience of the people who participate at this level* can be extrapolated to the classrooms by the actors who have the capacity to be in them. The *training of personnel* in this sense generates value while reaching the desired goal.

4: Which methods, tools and tricks, team building you put in place?

The *co-creation* of work teams and the generation of research networks (with the activities that this entails) are fundamental for the success of the development of this type of project. It is necessary the *involvement of different parties* (stakeholders, sponsors, and peers) to tackle the project execution, this is very applied in PM, for this reason the study and transport of the lessons learned in the development of this type of processes that go beyond the academia, is a key point for the *training of the people* in charge of transmitting knowledge and experiences.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

Regarding the barriers, the subject returns to the issue of the intentions of generating ID/TD learning but the impossibility of not having an *environment* that accompanies this approach to education. The participant talks about the isolation his

department has in his intentions to insert these programmes, which is why highlights that is necessary to return to the need of making *a decision that comes from the core of the institution*, with a view to the future training of the students, and to create a plan that suggests a career path, and not just isolated courses that train heads in particular subjects. Issues that are mentioned again, such as the *need for practical-based learning*, the *lack of training and/or (perhaps worse) the lack of commitment of the teaching staff*. Finally, reference is again made to the *lack of institutional support* for the development of projects of this kind, due to the *lack of commitment* of those who have the final voice.

It is of course not an easy task to *get those in charge of transmitting knowledge out of their usual manner*, their comfort zone with regard to the teaching of the material and the way of delivering it, but it is a need that is being reflected at all educational levels, and in the development of the graduates as professionals since they are *leaving university incomplete for the companies*, the skills that today are required in the professional development sector. These skills are not being acquired in the previous stages of study, so an additional step is necessary for both parts in terms of formation.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

Once again, we can find the *urgent real-world problems* that mobilise human beings and make us, as part of the system that we are, take matters into our own hands in order to try to prevent and overcome the problems that may arise from them.

On the other hand, the failure of current curricula is highlighted again, and a combination is made with the previously mentioned "*success stories*", referring to curricula where ID/TD is included, and which are already applied in "*high level institutions*". This would also lead to the *university as an innovator*, benefiting both its figure and the construction of knowledge and skills in the students who attend it.

Participant 10: M.GA.

Research Centre: Windesheim (NL)

https://www.windesheim.nl/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The participant mentions in this initial stage how the institution in which she works *pushes its students* to participate in activities, it seems to have a diagram (or perhaps it is not intentional), about the importance of *connectivity and relationship between disciplines*, to generate a formation to the students as it is needed in the present times. It is also reflected here the possibility of integrating *different figures in the training process*, which usually occurs for example in courses related to entrepreneurship or the launch of new projects such as the "*angels*", which would be useful *for guiding groups of students*, giving other perspectives to the solution of the problems posed for teamwork.

Section 2. Implementation

3: How do you make ID/TD Education happen?

The usefulness of finding a solution in a *collaborative* way is clearly mentioned in terms of the performance of the activities in an ID way. This refers to what the participant describes as working jointly, approaching issues from different perspectives despite one's background, to adapt the students to take on whatever role is necessary, always within their reach, to make the most of their potential, in the development of projects.

4: Which methods, tools and tricks, team building you put in place?

Learning from the experience and experiences of others is a fundamental instrument to be integrated in the process of education and training of people as actors. The key action is the *generation of these meeting places* (workshops, interviews, conferences, etc.) where the possibility of interacting or simply absorbing the past of other actors, who have lived and have other points of view, generated by their previous experiences, their experiences, and their training, is opened up.

The interviewee specifies key instruments for transition and facing the challenges of current times as: *Theory of Change, Theory U, Systems Thinking, Universal Responsibility, 4-E Model*. Each one is individual as a technique, but *closely connected* to the contribution of a transformation in the system. It is necessary to highlight how the inclusion of this type of tools requires us to *manage the projects with methodologies that adapt to the needs that arise*, therefore differentiate between typologies such as *waterfall* (where each stage of the project is marked, where one begins, the previous one ends), and use methodologies in which we can face the process in a planned but more adaptive way, such as the use of *agile methodologies* already mentioned above and to continue developing.

5: Do you have prior experience in working in this way?

6: If yes, did you take learnings from those earlier experiences?

The insertion of *students in the world of ID work* is very important to prepare them for the challenges of future professional life, and also gives them a broader perspective on the possibilities for solving the problems they face in their environment. In this way these will be the future *value creators*, who will have to deal with the mentioned *networks* and adjectivated as transdisciplinary, already having training and capacity to broaden their spectrum of action and contribute to the formation of practical and homogeneous solutions in the working group.

It is also necessary to emphasize that the previous experience of the students in issues related to those they will face in the future, will give them a higher level of confidence to carry out and be *leaders* in the actions to be taken, which is given from the connection of people with their own internal knowledge (previously acquired in their training).

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

A key point in the possibility of really generating a change is highlighted by the interviewee in this section, and he refers to the "*Resistance from participants*", if they are not willing to be trained, to take advantage of the possibilities offered, to absorb the experience of those who are in charge, there will be no change possible. This resistance is commonly visible at higher levels, where the people in question already have a background in certain issues, and have more marked personal and internal tendencies, which make them adverse to change. “People tend to avoid the unknown", this is merely because *they do not want to leave their comfort zone*, because they have never experienced it, because they are afraid of "what will happen if...".

The fact of pushing (with the necessary tools) the chicks from the nest to take their first flight is fundamental for the *individual development of the persons as itself*, facing new challenges, living new experiences, meeting new people belonging to different sectors, cultures, social classes, which help to *empathize people*, increases self-esteem, which also generates an increase in the development of hard and soft skills for problem solving and decision making.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

10: Could you tell us a story about your case of success?

11: Could you tell us a story about your case of failure?

Regarding sustainability in general and the trigger/enablers for a sustainable urban transformation, the participant approaches the subject from a broader perspective (great!), stating that *it is necessary to take over the cities*, "we need to take over the city and take care of it because it is ours, urban sustainability is the responsibility to keep our house tidy". The need then arises to *engage the people who are part of it*, to *make them responsible* for the change they want to see, and not for someone else to generate it for them (*agents, generators of change*).

The transition of this process has been seen with respect to classical education activities from students to teachers, with defined roles, but ultimately it is *the influence from one being to another*, the transmission of awareness on particular issues, based on past experiences and the formation of a more *transformative mind.* Therefore, we can extrapolate the need to form us as responsible citizens in the different roles we assume in the different sectors in which we participate (university, work, neighbourhood, training club, etc), and through *mindfulness* which promotes the ability to tackle wicked problems through opening creative channel. With this perspective, we can come to *integrate mind, body and spirit within a holistic framework* that allows us as a society to take the helm of the ship in which are abroad travelling.

Participant 11: M.G.

Research Centre: ERSILIA Foundation

http://www.ersilia.org/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

In this first section of presentation and recognition of the work done, the author refers to the foundation in which she works promoting research and learning ID/TD, and the advocacy they generate in the same with respect to *innovation in education and sustainable cities*. It is very important the capacity to create the sense of a *sustainable city* and at the same time *to be sustainable*, that is to say, to be maintained in the time, for what the *transformation must be born from the core* and to be instilled in the depth of the parties in participation. On the other hand, disseminating and working on *innovation* with such a perspective can lead to the emergence of isolated projects with cutting-edge technology that may not work... or that if they do, they are disruptive, and the rest must follow or chase after them. It would be necessary to understand then the *modifications to be carried out in or from the governance* (of the organization, of whatever kind) to achieve great magnitude advances.

Section 2. Implementation

3: How do you make ID/TD Education happen?

4: Which methods, tools and tricks, team building you put in place?

As far as implementation is concerned, the author points out that they are part of a *network of institutions* (they have already carried out training work), but is it necessary only to belong to this network in the development of activities? From the point of view of projects and project management, it is necessary to form larger and *larger networks*, and *to be able to synergise the work to be carried out with the partners who are best suited to the search for better results*.

This allows the formation of *more efficient work teams*, where the best qualities and the most qualified people in the specific topics that concern the project in question are used. For this reason, the inclusion of tools, methods and tricks for team building is also key (*Theory U, design thinking, agile, storytelling, design thinking, team building*). The aim is to have a wide repertoire of tools, methods, and tricks for each project, to be able to *have the professionals, methods and knowledge that best adapt to the tasks to be carried out*.

It is very interesting to note that *impro theatre* is mentioned as a tool used for the development of these skills and teamwork, as it is a transpolation to the reality we are living in today, where constant problems, with diverse roots and effects on our systems, attack and we must be prepared to know how to improvise on the fly. This always applies to *being aware of the path we must follow*, since it has been planned, but it involves generating the capacity to *make decisions under pressure*. Often, improvisation on the fly brings better results than those that emerge from a structured and structured planning.

5: Do you have prior experience in working in this way?

6: If yes, did you take learnings from those earlier experiences?

It is said that work has begun to focus on problem- and project-based learning, for different educational levels, starting with primary and secondary school, and now applied in recent years also at the university level.

Again, we see reflected the intention of generating a model in which the *students*, current and future agents of change, are the *protagonists of the educational process*. A close relationship with PM can be seen in terms of teaching methodologies (PBL), this is also reflected in what the participant refers to as the need to *take time for teambuilding*, selecting each personality with the position that best suits him (hence the need to form teams with diverse skills and personalities). Thus, the aim is to create a *positive work environment* (necessary in the development of all types of projects),

where *participants feel confident*, and thus can apply the *action-confidence* concept in practice, not worrying so much about what happens, and have more confidence in themselves to "*try and see what happens*" (Pomeroy & Oliver, 2021).

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

When we refer to obstacles, we have already heard about cases in which the teachers or the people in charge of transmitting the knowledge are the ones who generate the barriers due to *lack of predisposition*, we have talked about the *resistance to change, to the unknown, to leave the comfort zone*. *Lack of time* to deliver the content is used as an excuse and the interviewee highlights as an obstacle the *excessive importance given to the content*, while what we really *need to change is the way in which it is transmitted* (it should be clarified that the content that should be transmitted is not detracted or taken out of focus, but it is a more solved issue). It is necessary to form a *collaborative culture*, through the application of the group formation tactics proposed as a tool to be used.

The development of ID/TD activities is again referred to as *isolated actions*, "short exercises" that are carried out, and many times are forgotten, without being done in a sustainable way. This also produces *frustration* in those who really try to apply this work, which ends up being more negative than not even initiating its implementation.

Once again, the *lack of support from the institutions* in terms of capital, time, and professional level for the implementation of these projects is highlighted.

8: Could you tell us examples in which these barriers made a project/an action fail?

Finally, with respect to the experiences, it should be noted that the author again mentions the *lack of institutional support* (as mentioned above), but also adds an interesting phrase referring to it: "*or this is what they say*", and this reflects that there

is evidently a *lack of interest and commitment on the part of those who must make the (high-level) decisions* for example, where to send and how to allocate the budget.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

We find again *challenge-based learning* as a technique to work on real-life challenges. The author calls 4Cs (*Creativity, Critical Thinking, Communication and Collaboration*) a very interesting combination to include as triggers/enablers. The key to the success of the application here is to *change the culture at all levels*: individual, work group, institutional and context or third parties that influence the organization.

The topic of *incentives* is repeated as a suggestion, but at this level we can highlight it as a necessity, since it is also included in the *formation of alliances* that emerge from it. Finally, the *learning-by-doing* methodology is also repeated, so that students absorb knowledge by doing, which is the real way to instil learning.

It is a fact that there is a *need to disseminate and publicize the practices being studied and implemented by certain sectors, institutions or individuals*, in order to transmit the knowledge and experiences acquired in practice.

10: Could you tell us a story about your case of success?

This is a case of a strong *connection between the academic and business sectors*, it is necessary to generate these meeting spaces, in which there is feedback from both parties, so that the *business sector can express its necesities* in terms of profiles and skills, so that the *university has the possibility of directing its plans in this direction*, facilitating the exchange and students a more direct employment opportunity. In addition to the formation of agreements that also facilitate this transition.

Having *milestones to accomplish* (the opportunity to present case studies to investors is mentioned for example), and/or objectives, *makes people and work groups feel encouraged*, this is also the reason for the inclusion of *agile methodologies* that generate for instance in methodologies like scrum these so-called "sprints", which propose a similar way of working, challenging and engaging those who develop the project.

11: Could you tell us a story about your case of failure?

The *co-creation of projects* within territorial sectors, bringing together and getting to know people who may not have had a relationship before is a difficult challenge to face, but if there are *facilitators* to make it possible, it can bring really good results. This joint work generates what was also mentioned before as the *sense of belonging*, to take ownership of the land and become owners of it, to *commit to its care and be responsible for it*. There are multiple examples of projects that work in this way, mainly seeking to generate awareness in people through a *sense of belonging*.

On the other hand, it is difficult to *fight against self-interest*, this is reflected from the root of a community to the tips of this leaves. People must learn to introspect, to feel in themselves and to learn that sometimes they must put aside comforts, interests, benefits granted, in order to generate a benefit that will be greater (in terms of territorial and communal scope). This is the same in the transition that is encouraged in the U-journey, in terms of moving *from an ego-system to an eco-system*, but it depends on factors such as the predisposition and possibility of someone to *influence the individual person to change from one to the whole system in ecological, social and spiritual terms*, generating a human consciousness that contributes to this transition process.

Participant 12: M.S.

Research Centre: Università La Sapienza

https://www.uniroma1.it/it

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

In the first section it can be highlighted by the example of the situation in the interviewee's institution, which frames *the need not only to have the intention of systematizing the activities* through courses and *the structure of the work to be done* (which is in any case a huge step in terms of the intention to form a transformation in the system), but it is also fundamental *the engagement of the different actors*, professionals of the different areas that must work on the project, *not only to co-initiate themselves in this journey,* but to commit themselves to carry it out in the right way, *interacting and putting themselves in the place of the others*, achieving an interaction with the different stakeholders. Otherwise, what the subject describes as "a series of individual, *monodisciplinary* activities" can happen, which leaves all the effort made in nothing, making it all in vain.

Section 2. Implementation

3: How do you make ID/TD Education happen?

A fundamental action that is remarkable in the generation of activities of this or any type that are transformative for the institutions, is the fact of *pushing the institutions towards it*. For this it is necessary, as a first premise, to *have the necessary knowledge* to require it, as well as *success cases*, examples of *institutions that are carrying out similar activities*, and finally also to have *people who support the project, who believe in it* and thus create teamwork to not do it in *isolation*, which we have already mentioned, can generate great *frustrations*. In this way it will be easier to overcome institutional and bureaucratic difficulties and any obstacles that may arise from different sectors.

4: Which methods, tools and tricks, team building you put in place?

We can find another way of working with a method already mentioned: *problem-based learning*, where the traditional lessons are left a bit aside, and the formation of *students as protagonists and generators of the learning* process is encouraged. In this case there is also an *involvement of external actors (experts)*, who contribute their view on the particular topics under study, and also has a plus the fact that it is commented on doing this process in a *different place* (simply "bringing students outside") as it awakens new receptors in the brains of students, the change also awakens new interests, and we address again in the process of transformation.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

As for the barriers, we find again common points already highlighted in previous interviews such as: *bureaucracy* (it appears both on the part of the authorities belonging to the *institution* in question, as well as on the part of higher authorities that regulate the activity as it is named here, *ministries*). On the other hand, we have already discussed the fact that *professors* are *not interested in changing the way they carry out their activities*, and that this exchange is made difficult by the *organizational structure of the institution*, which is generally organized by *individual departments and without interconnection with the others*, making the possibilities of ID/TD work difficult.

Finally, as for the *students*, it is necessary to generate a well-structured plan, with a thread to follow, and in a way in which they are not simply attacked with different practices and perspectives that do not lead to any concrete objective, because it can make them *get lost in a sea of information*, and do not get to build knowledge.

8: Could you tell us examples in which these barriers made a project/an action fail?

In this case we can see and use as an example a phrase that is used for this type of situation where "*who encompasses much, squeezes little*", this refers to the fact that the ID or TD, should be given from a formative point of view which *allows students to also specialize in something they are interested in*, also giving them the tools to interact and have knowledge of different areas, but *it is impossible to train professionals in multiple fields*, but it is more about grouping professionals subsequently trained with perspectives and tools for teamwork, leadership and understanding. The flexibility of the student trajectory is a great idea, but the way to apply this should be directed to, as mentioned above, the interests of those who will be the future professionals.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

Regarding the triggers/enablers, the author emphasizes that they come from the "*real world*", thus seeking again an action-reaction effect, where the institutions must use the ID/TD to *solve problems* that concern them or that they are also capable of addressing. The need to face these problems and to solve the needs that the "real world" is today showing in terms of education in sustainability, makes it more and more evident to see how people are joining to push the entities to be part of this transformation, being them self who must change, and generate the societal change.

Participant 13: N.B.

Research Centre: University of Delft

https://www.tudelft.nl/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The *multidisciplinary mode of organization* and the facing of "ill-defined assignments" is seen from the PM as a process for the conformation of work teams with the necessary skills to face a *project-problem* that must be solved in a *collaborative and cooperative way*, with common goals oriented towards a concrete objective.

Section 2. Implementation

3: How do you make ID/TD Education happen?

It is interesting to consider the involvement of *non-academic partners as transmitters of real-life problems* that can be solved or serve in the educational world, in this way it becomes more interesting to propose problems to be solved and applied to *real cases* that motivate the development of the activity. A point that is repeated is the development of *collaborative work* and in multidisciplinary groups for the deliverables, and a relationship is made with the PM in the definition of *stages that are raised* (problem-definition and problem-solving phases), what the PM can contribute are work methodologies, and tools such as Scrum to consciously differentiate these stages and perform it in a different way, generating greater commitment in the interested parties.

4: Which methods, tools and tricks, team building you put in place?

As far as the formation of groups is concerned, the *investment in relationships* stands out, something that is imperative for both ID/TD and PM, from which there is a different view that contributes to the *formation of teams* according to the *results sought*, and thus be able to *adapt to the best profiles* that are available (or that can be found) to fulfil these tasks. Then work strategies that *make students more aware* of how their work should be carried out, living experiences and being able to get involved with people from different fields, cultures, social groups, makes them *achieve a level of maturity* and awareness that is what we need in today's times.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

It is very interesting the point she raises about the way in which *teachers' performance is evaluated*, *requiring* them *to carry out MD/ID/TD* tasks, but in practice they are *evaluated in terms of their discipline*.

On the other hand, the *lack of incentives and support* is again highlighted, since the development of these activities entails great *efforts*, high levels of *attention* and *work*, so it is not something easy or simple to do.

She talks about the *penalization* of situations that cross (well done!) the *barriers imposed by the backwardness of the plans established* by higher authorities, which are difficult to modify, and for which it is necessary to dedicate extra work to fill in when presenting such a work, since it is necessary to go back to the purely disciplinary part.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

Problem-based learning is highlighted again, and the *involvement and management of the different stakeholders* that are part of the system to carry out a TD work is also discussed. The contrast that can be made with a company (smaller systems, less bureaucratic, with more tools and the possibility of making decisions in a faster and more efficient way) is discussed, and the important thing is to be able to take them as an example to follow a path in which they are more advanced. It is also important to generate *alliances* as has been mentioned to strengthen the students' path and their insertion in the professional world.

It also refers to the recognition of the degree of *disciplinarity of the projects*, to provide the *level of support they need*, and therefore the results they can deliver.

Participant 14: O.B.

Research Centre: ICS - University of Lisbon

https://www.ics.ulisboa.pt/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

Primarily, the interviewee refers to her activity on the *understanding of the future of sustainability*, and how the way to face it is through the ID/TD. It is interesting to see here how *the definition of a given problem is approached from a sustainability perspective*, and how the same problem, from this perspective, *can be redefined and reframed to find a solution based on it*. From the PM, having a harder perspective that applies only to general projects, a transfer can be made and generalize the way in which *conflicts are resolved* and the tools used for this, and how to identify and *mitigate potential risks* so that they do not happen or generate less impact on the development of activities.

Section 2. Implementation

3: How do you make ID/TD Education happen?

The interviewee refers to techniques used to generate ID work, and to *leave aside the univocal way* in which problems are currently faced. The *interconnection of perspectives* and *collaborative work* are also used in the resolution or sorting of complex situations in project management, for which tools such as the elaboration of a

communications matrix, *matrix of responsibilities*, among others, which are made by the *group of professionals* in a collaborative way, are integrated.

4: Which methods, tools and tricks, team building you put in place?

The concepts that are mentioned have accordance with what it has been talked previously and should be used with a view to the formation of *harmonious work teams* that achieve the best and most optimal results. For this, it is mentioned the formation of *workspaces*, where the *members feel safe* and *generate confidence* in them and in the group, to be authentic as professionals, but also as people, so *the best of the human aspect* in the conformation of the work team can be taken out. Now, it is necessary to define the use of tools to be able to do this in a *systematized way*, and the process can be followed as in PM is done, for example using tools such as the *Four-Stage Model of Project Team Building*, creating a *Skill Inventory*, among others already mentioned.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

Some general points are shared again, such as the *lack of training of personnel*, *lack of interest of authorities* or of those who have the *power to make decisions*, as well as the *lack of inclusion of plans that contemplate this type of activities* so that the personnel have the possibility to engage in these activities. More particular points are also highlighted in the *vision of personnel training*, mainly in terms of *soft skills*, such as the work on leadership tools, adaptability, creativity, etc. *Fear*, raised as a problem to be overcome, must also be worked on in all the sectors that make up the system.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

The search for the *contribution of external actors* to the project itself, but who are nevertheless affected and are part of the system, makes the TD work to *be driven and generates a greater commitment by all stakeholders*, making each of the actors enter into a current from which it is difficult to get off. Now, achieving this will be possible as long as *organizational and planning tasks are previously implemented*, which can be contributed from the PM, since there are positive experiences on this side, for example the implementation of *Breakdown Structures* for the division of labour, the products we seek to achieve and resource allocation. This seeks to engage everyone to fulfil their responsibilities and to stick to what the others also perform and *co-create*, complementing the tasks for the fulfilment of the objectives.

10: Could you tell us a story about your case of success?

The mere implementation of projects and *going along the way breaking through the imposed barriers* that stop us from reaching the objectives we seek, and we know from the support of the masses that it is the right thing to do, is also a technique to take into account when launching a project. The example teaches us how to constantly *fight against barriers* that will generally appear, can generate *changes in mentality* once the positive changes are seen, but can often be the only way to implement it, and even allows us to *plan and mitigate the risks and delays* that may cause in the development of the activity.

Participant 15: P.G.

Research Centre: Universidad Pompeu Fabra

https://www.upf.edu/es/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The interviewee does not define his activity as educational, but as research, although the fact of doing this work, it is induced, has as its objective the *generation of knowledge* and the search for *solutions to practical problems*. In this case, the problems are faced with a *more social and humanistic perspective*, studying the structures and the integration of humanities and science, which becomes extremely interesting when it comes to integrate it with *hard tools and methodologies such as PM's own procedures*. A joint work between PM is formulated, mainly in the areas of *human resources management* and *communications management*, in order to analyse and *generate awareness in people* about the role they play and how they can improve their position in the development of the project.

Section 2. Implementation

3: How do you make ID/TD Education happen?

4: Which methods, tools and tricks, team building you put in place?

5: Do you have prior experience in working in this way?

6: If yes, did you take learnings from those earlier experiences?

There seems to be a set up in which it is difficult to see how to work in a more ID/TD way, as there is a very *strong structure in terms of departmental division level* and *purely disciplinary work*. Restructuring and facilitating the *formation of interdepartmental teams for the implementation of particular projects* is a possibility as a first step in the search for a more integrated and sustainable work.

It also refers to a need for the integration of ID tools and methods in sectors that are more backward in this sense, and in which *isolated actions are being carried out* on the subject. It is also necessary to *expose the topics*, the *ways of working* and the *results* that this form generates, in *multiple formats* and *disseminate* it to broaden *the*

reach and support. It would generate a increase on the credibility of the project in the community (from multiple levels of decision and dissemination for the support of stakeholders).

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

The *structures of the institutions*, the *departmental division*, says the interviewee, and the *educational curricula*, are exposed as an obstacle to the integration of less hard disciplines such as the humanities in science. From the PM it is possible to include related subjects of study such as *Work Management* (WM), a process that integrates human capital with technology, means of work and materials in the processes, through the application of methods and procedures that make it possible to work in a rational, harmonious and uninterrupted way, with the required levels of safety and health, economic and environmental requirements, to achieve maximum productivity, efficiency, effectiveness and meet the needs of society. WM helps employees, teams and departments to *work in an integrated way* in order to create a *sense of cooperation* that helps the organization to achieve its objectives and generate profits.

An obstacle also arises again in the academic world in terms of *evaluation and recruitment*, as the implementation of ID/TD is punished by the authorities. It is therefore necessary to generate an *integration in the plans* that contemplate the importance of this work, to understand its importance and the level of positive results that it generates.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

The interviewer brings up new tools that help the launching of attitudes towards a sustainable urban transformation, such as *storytelling and narratives*, not previously considered by the participants or in the analysis, which is certainly very important, since it is a *way to transmit real information* and, as indicated, to *discredit toxic information that is circulating.* On the PM side, techniques can be used especially in what refers to the *management of communications*: it is necessary to *plan them, make a distribution of information setting the necessary channels to do it successfully, report the performance of the processes and also make a management of the stakeholders*. For this it would be also necessary to make a clear *division in the structure*, so that the tasks are carried out by experts in the subject, and to divide *groups of processes.* In PM they are divided into groups of: *initiation, planning, execution, follow-up and control, and closing of the projects.*

10: Could you tell us a story about your case of success?

The experimentation of this process about combining *storytelling* for the shift on the perception of social phenomena, is a clear example that can be extrapolated and proven to be useful for its application in the *world of education*, which will also generate a *transformation in the entire system*.

Participant 16: R.F.

Research Centre: Free lance Coach

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The activities carried out by the interviewer are of great relevance for the analysis, since there is a *combination of several approaches and methods* (such as TD, education for sustainability development, transformative learning, counseling and coaching, creative leadership, agile methodologies, among others) which are not easy to combine, but when put together they can become a very powerful tool for this transition. It is also important to differentiate and classify (in PM the *stakeholder matrix* is used) the individuals or groups with whom we work, so that we know how to manage them.

The use of *Citizen Science Projects* manages to generate commitment on the part of society's actors, who are involved, breaking down big tasks into understandable components that anyone can perform.

A point that has not been discussed before is also *competency-based learning*, which combines education with professional work, seeking to generate skills, abilities and knowledge inside and outside the classroom. The development of competencies includes the combination and implementation of cognitive, affective, psychomotor and sociological aspects (Valiente & Galdeano, 2009). Therefore, it also enhances in the inclusion of *problem-based learning* as a method to have in consideration. The PM, on the other hand, emphasizes the *development of competencies* to exercise in practice as a leader and classifies them as: *leadership, planning capacity, risk and problem identification, communication, time management, negotiation and technical knowledge*. It is therefore necessary to rethink educational models and their design objectives, as well as evaluation criteria and procedures.

Section 2. Implementation

3: How do you make ID/TD Education happen?

It is necessary to have profiles that occupy roles such as those described above, and are aware to engage with the situation, taking the position of listeners and directors to all stakeholders, to know what the real needs in the system are.

4: Which methods, tools and tricks, team building you put in place?

The interviewee names multiple methods, tools and tricks she uses for team building and for the educational and formative development of the groups he works with: *experience learning, process facilitation, design and systemic thinking, level-awareness, embodied practices*, among others.

It is extremely interesting to study his work, because as Scharmer in the Theory-U specifies a deeper innovation and learning process takes place, because the transformation is about accessing the "deepest source of our intuition, both as an individual and also as a team, a group, as a system". The participant seeks to train people *leaving aside the traditional methods* of simple transfer of information, doing an *internal work of each one*, bringing to light aspects and *softer skills* such as imaginative work, generation of consciousness, expression and corporal development, the mixture of art with science, *nature-based experiences* that help the human being to connect with oneself, and thus, to know oneself to involve his/her being in the system.

5: Do you have prior experience in working in this way?

6: If yes, did you take learnings from those earlier experiences?

When it comes about experiences and lessons learned in activities of this type, the interviewee highlights the *personal part, the ability to be at ease with oneself*, *to generate environments of trust and self-confidence*. And as a key point, "*Have a sound method/toolbox for transformation and particularly for transdisciplinary collaboration*", which is fundamental for the development of any activity. From PM there are already *toolkits* to know how to *develop projects*, which can be used to extrapolate and add tactics such as the ways of working used by the participant, for the development of an implementation map in the transition to sustainability education.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

Previously highlighted barriers are raised and repeated: - *Teachers unwilling to change their way of teaching*. For which it is proposed to generate a *structural change* in which they are forced to do so, but on the other hand, to *help, guide and give them the necessary tools* for the proper development of the activity; - *Students who also do not feel confident in this new way of learning*. Therefore, a constant *monitoring and guidance* is proposed, to generate a safe zone, in which they can develop and acquire new skills and competencies. Empathize with them; - *Incentives*: implementation is hindered by problems of financing, struggle of interests. Underlying paradigms and mentalities.

It is possible to propose formal project plans, taking into account all the factors discussed above and considering the radical change in the structure, which allows to eliminate the restrictions and to carry out a gradual *transformation of the system*, in which the different obstacles are attacked one by one, and to expose the results (monitoring and controlling) for the rearrangement of future actions, as each of the stages (*Initial Analysis, Planning, Execution, Monitoring and Completion*) of the project are carried out in PM.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

10: Could you tell us a story about your case of success?

In this section we will highlight some points that have total congruence with what is done in PM and that had not been highlighted by previous participants, and that is *having clear ownership of the problem*, as it happens in PM when they are defined,

having who is/are aware of the various actors involved, roles within the work teams and makes each member responsible for the problems that must be faced in their position. For this purpose, tools are used, for the *analysis of the importance of risks in the project*, identifying and generating *corrective, preventive* and in some cases *reactive* actions against risks, in order to meet the requirements of the project.

The points mentioned above also stand out, such as working with *real-world problems*, the use of *problem-, solution-oriented learning and teaching methods* in which all stakeholders are involved and contribute value to the generation of the system. For this it is worth remarking again, it is necessary that the teachers and those in charge of transmitting the knowledge, are properly *trained and prepared*, as well as the *students*, to be constant. The *collaborative activities* (co-teaching, co-creation, etc) so that all parties can learn from each other, *working as a team* and thus generate a greater development and impact.

Participant 17: S.C.

Research Centre: Universidade Aberta

https://portal.uab.pt/

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The interviewee comments as something far from the fact of the implementation of TD in her university, being that she carries out *isolated activities* on the subject in question. Meanwhile, Sustainability Education (SE) must be taught *from high levels* (as peer teaching is pointed out) to the *lowest levels*, inculcating and making it possible through the application of integrated plans where the different edges of the parts

involved are contemplated, considering *people, planet, profits, future*. The *managing of the project life-cycle* could be integrated from PM in order to track the progression of the project, can apply some tools also used in Sustainable Project Management (SPM) for *improve communication and collaboration* in all the different levels of the project, but specially remarkable, between the institution and the rest of the stakeholders in order to increase their satisfaction, and aligning interests between *sustainability, projects, organization and external actors*. All the points indicated previously, have the aim of increasing the effectiveness of *cope with the complexity* that this kind of projects have.

Section 2. Implementation

3: How do you make ID/TD Education happen?

4: Which methods, tools and tricks, team building you put in place?

It is again pointed out the importance of *problem-based learning*, the creation of *spaces in which the participants can discuss* about the problems they have to deal with, and the *integration of study cases*, used as example and as *real-world problems* that increase the incentive of the students. We must remember not just to transfer knowledge but make the students to be agents in the process of learning, educate *change-makers* in the societies of the future.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

8: Could you tell us examples in which these barriers made a project/an action fail?

Some of the points highlighted previously are indicated again, and it is necessary to remark the importance of integrating this change *from the source*, from the deeper structure of the *governance* in the university or the institution we are working with, in order to have clear *strategies to follow*, have available knowledge, skills, and

resources in terms of funds, time, HR and all the ones necessary to develop the activities successfully, but always *contemplating a plan* that let us use them in the most efficient way, managing correctly and optimizing their utilization. It is also necessary to *convince most stakeholders* that the plan is correct (or double-check it for make it great), letting them participate in the making of it in order to generate the necessary engagement from them and *create a collaborative working environment*.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

10: Could you tell us a story about your case of success?

There is a high level of agreement regarding the transformation in SE and the implementation of ID/TD, in which *collaborative work* should act as a centre in which coherence the parties involved. Training in aspects in which professionals are not conventionally trained (*decision making, design and system thinking, negotiation of learning and teaching under the umbrella of co-creation*) is necessary to generate a paradigm shift, necessary to face the imposed challenge, *changing the rationality in the educational world*.

From Sustainable Project Management (SPM) it is fundamental to foster a deeper, *substantive thinking* in students in management education courses, asking them to *face disorienting dilemmas and question their assumptions*, and this should also be applied in the rest of institutions as a tool confident to be used, and it could be a practical method to deal with *students' lack of collaboration*. Also, not remarked before, it is necessary to work in *true partnership* at the student level, in the *formation of groups* and the work of values such as *empathy* towards their peers since it is fundamental that this happens at all levels, and not only as it was proposed at the educators' level in order to *co-create learning*.

Highlighting *success stories* (exposing *case studies*, prototypes of implementation in *empirical studies*), generates *incentive* in the rest of the institutions and serves as an example manual for the dissemination of the theme and the *generation of awareness*, *sensitizing society* and those who belong to the system to foster the *development of teaching and learning strategies* for sustainability management education.

Participant 18: T.G.

Research Centre: University of Bilbao

https://www.ehu.eus/es/home

Section 1. Definition

1: Would you define your education activity as ID/TD? If so, why?

2: Which SDGs you can map your activity on?

The interviewee emphasizes not working on ID/TD aspects but is *aware of it*. However, the development of *soft skills* (such as teamwork and critical thinking), not planned in *curricula* and so necessary for the *personal and professional development* of students, is reemphasized in relation to the topic.

Section 2. Implementation

3: How do you make ID/TD Education happen?

4: Which methods, tools and tricks, team building you put in place?

5: Do you have prior experience in working in this way?

6: If yes, did you take learnings from those earlier experiences?

In terms of implementation, common points with previous interviews such as *PBL*, *team working techniques, training of the personnel* are highlighted again. It is also necessary to consider the *lack of homogeneity in a course of study*, techniques are advised to work against this and deal with the counter-uniformity that can be generated in the process. From the PM, there are already diagrammed *techniques and strategies to deal with conflicts*, these include the search for the *root cause*, *working with emotions*, *collaboration between the parties*, etc. It is necessary to do an internal work and to be able to focus more on the personal part, leaving aside the technical part for a moment.

It is also important, as has been mentioned above, the *implementation of structured plans*, with *well-defined curricula*, and *well-prepared activities*, but at the same time *be flexible enough* to let the *students be the protagonists*, making them enjoy the activities organized, and the possibility of carrying them out in their own way, as long as they meet the objectives sought.

Section 3. Obstacles

7: What are the barriers you encountered in ID/TD work in education?

As obstacles to be overcome, the *lack of staff training on ID/TD*, the *lack of flexibility in the curricula* (which needs to be adapted to nowadays necessities and work as a generator matrix for the other structures), and the *additional workload* when trying to implement this type of education are highlighted.

There is a strong emphasis on the *lack of willingness on the part of students* to carry out these *non-traditional methods*, so it is important to make in the pedagogy and activities a simplification of the traditional way of learning by encouraging and *changing the paradigm in the students*, starting from a general approach, and making it emerge from the needs in today's world, making them realise the importance of their training for their development in their future roles.

8: Could you tell us examples in which these barriers made a project/an action fail?

The *follow-up work by the teacher*, it is indicated, *is in difficulty proportional to the number of students in the course*. In order to manage this in a correct way, it is necessary to *set up working groups* and *delegate tasks*, making, as mentioned above, the *students take on the role of leaders*, helping them to work on these capacities and making them *generators of change* and *protagonists in the learning process*.

Section 4. Trigger/ Enabler

9: What could be a trigger/enable ID/TD education for a sustainable urban transformation?

10: Could you tell us a story about your case of success?

Strongly influencing *external factors* such as *public policy management* are always key in the development of any kind of project. This is why it is necessary to *involve and convince those who have control* over issues such as curriculum development, *authorities* also at the organizational level who are convinced of the need for the application of this new teaching methodologies, and thus have the matrix that works as a *framework for the transformation* of the system. It is also necessary the support of *people from different fields, sectors and protagonists of different roles*, who have the necessary knowledge for the *training* of those who will be in charge of delivering the new tools and methodologies discussed to the students, and who can highlight the way in which the students are working either *consciously or unconsciously*, working the consciousness and the development on the topics in concern.

	Participant	Nationality	Gender	Age Group	Research Centre	Website
1	A.D.	German	F	40-50	*CENSE*	*https://www.cense.fct.unl.pt/*
2	C.V.	Romanina	F	40-50	*Istituto per la Ricerca Sociale (IRS)*	https://www.irsonline.it/it
3	D.F.	French/Spanish	M	40-50	Universitat Politecnica de Catalunya	https://www.upc.edu/ca
4	E.O.	Swedish	M	50-60	University of Gothenburg	https://www.gu.se/en
5	J.F.	Australian	F	40-50	La Trobe University	https://www.latrobe.edu.au/
6	J.D.	Australian	F	70-80	Former QOT	https://learninghub.earlychildhoodaustralia.org.au/
7	K.M.	Dutch	M	70-80	University of Delft	https://www.tudelft.nl/
8	L.L.	French	F	20-30	Politecnico di Torino	https://www.polito.it/
9	L.C.	Italian	M	30-40	Universitat Internacional de Catalunya	https://www.uic.es/es
10	M.GA.	Spanish	F	40-50	Windesheim	https://www.windesheim.nl/
11	M.G.	Costarican	F	40-50	ERSILIA Foundation	http://www.ersilia.org/
12	M.S.	Italian	M	50-60	Università La Sapienza	https://www.uniroma1.it/it
13	N.B.	Dutch	F	40-50	University of Delft	https://www.tudelft.nl/
14	O.B.	Italian	F	50-60	University of Lisbon - ICS	https://www.ics.ulisboa.pt/
15	P.G.	Italian	M	30-40	Universidad Pompeu Fabra	https://www.upf.edu/es/
16	R.F.	Swiss	F	40-50	Free lance Coach	
17	S.C.	Portuguese	F	40-50	Universidade Aberta	https://portal.uab.pt/
18	T.G.	Spanish	F	50-60	University of Bilbao	https://www.ehu.eus/es/home

Table 5. Sample Characterization and Research Centres information

It is possible to visualize on the **Table 5**, the sample characterization, making a differentiation among the participants and sorting them depending on their nationality, age and gender, data which will be discussed after. On the other hand, on the table the information for each participant and their respective research centres is reflected, including the websites, in order to be able to enter and compare the information on the third level of analysis.

3.2 Clustering the analysis results

Based on the inductivist analysis carried out above, the following **Table *6*** summarises the extracted results, differentiating in each of the interviewees, the elements and characteristics of PM and SE that were clustered in the 18 analysis groups, which will be presented one by one later on. A distinction is also made between the terms and concepts that were mentioned explicitly (expressed as words or phrases belonging to the different clusters) or that have been induced by the author as the use and inclusion of certain tools that belong to one of the different groups, the former are shown in light in the table, while the latter are highlighted in bold.

Interviewee	Elements/ Features
1	2. Co-creation **3. Curricula and organizational culture sustainability co-adaptation** **5. Leadership (Distributed)** 9. Personnel training (Support staff) 12. Stakeholders' engagement
2	1. Agile management 2. Co-creational and collaborative work **3. Curricula and organizational culture sustainability co-adaptation** **8. Networking** **10. Program Management Tools** **12. Stakeholders' engagement** 16. Theory U (Shadowing - seeing - sensing)
3	**1. Agile methodologies** 2. Co-creational and collaborative work **3. Curricula and organizational culture sustainability co-adaptation** **5. Leadership (inclusive)** 7. Mixing art-science 8. Networking **9. Personnel training** **12. Stakeholders' engagement (High-levels authorities)** **13. Sustainability Reports (Focus and not just "extra activities")** 14. Design thinking & PBL 16. Theory U (complexity/ uncertainty)
4	**3. Curricula and organizational culture sustainability co-adaptation** **4. Governance management** **5. Leadership (distributed)** **10. Program management tools (defined roles and levels of interaction)** 12. Stakeholders' engagement **15. Team development models** **16. Theory U (system transformation/ people's awareness)** **17. Transformative sustainable learning**
5	**3. Curricula and organizational culture sustainability co-adaptation** **5. Leadership** **11. Skills Inventory** **14. Design thinking & PBL** **16. Theory U (Face complexity and uncertainty/ Consciousness and awareness)**

6	**1. Agile methodologies** 5. Leadership **6. Motivational & Incentivisation** **13. Sustainability Reports (core/centre focus acts)** 14. System thinking & PBL **17. Transformative sustainable learning**
7	**4. Governance management** **6. Motivational & Incentivisation** **9. Personnel training** **10. Program management tools (roles definition)** **11. Skills inventory** 12. Stakeholders' engagement 14. Design thinking & PBL
8	**2. Co-creational and collaborative work** **6. Motivation & Incentivisation** **8. Networking** **12. Stakeholders' engagement** 14. Design Thinking & PBL (real-world problems) **16. Theory U (inner transformation)**
9	**6. Motivation & Incentivisation** 8. Networking **9. Personnel training** **10. Program management tools (isolation)** **14. Design thinking & PBL** **16. Theory U (Get out the comfort zone)**
10	2. Co-creational and collaborative work **5. Leadership (skills)** **6. Motivational & Incentivisation** 7. Mixing art-science (Mindfulness, creativity/ mind-heart-body) 8. Networking 14. Systems Thinking & PBL **16. Theory U (Get out the comfort zone)** **17. Transformative sustainable learning**

11	1. Agile methodologies **2. Co-creational and collaborative work** **4. Governance management** 6. Motivation & Incentivisation (Storytelling) **8. Networking** **10. Program management tools (isolation)** 14. Design thinking & PBL 15. Team development models **16. Theory U (Ego- to eco-system / personal inner development)**
12	**1. Agile methodologies** **3. Curricula and organizational culture sustainability co-adaptation** **4. Governance management** **8. Networking** 10. Program management tools (Well-defined roles and levels of interaction) **12. Stakeholders' engagement** 14. Design thinking & PBL **16. Theory U (journey planification)** **18. Sustainable project management**
13	**1. Agile Management** 2. Co-creational and collaborative work **4. Governance management** **10. Program management tools (time, budget management and optimization)** 12. Stakeholders' engagement **14. Design thinking & PBL**
14	2. Co-creational and collaborative work 5. Leadership (Innovative) 6. Motivation & Incentivisation **9. Personnel training** **10. Program management tools** **11. Skill Inventory** **12. Stakeholders' engagement** **15. Team Development Models**
15	**3.Curricula on sustainability adaptation** 6. Motivation & Incentivisation **10. Program management tools (isolation)** **15. Team Development Models** 16. Theory U (transformation of the system) **17. Transformative sustainable learning**

16	**2. Co-creational and collaborative work** 7. Mixing art-science **11. Skills Inventory (soft skills)** **12. Stakeholders' engagement** 14. Design thinking & PBL **16. Theory U (deeper innovation/learning processes/ personal inner development/ Self and stress management)** **17. Transformative sustainable learning (cognitive, affective, psychomotor and sociological aspects)**
17	2. Co-creational and collaborative work 3.Curricula and organizational culture sustainability co-adaptation **4. Governance management** 6. Motivation & Incentivisation **8. Networking** **12. Stakeholders' engagement** **16. Theory U (cope with complexity of the systems)** **18. Sustainable Project Management**
18	**3.Curricula and organizational culture sustainability co-adaptation** **4. Governance management** **5. Leadership** **9. Personnel training** 11. Skills Inventory (soft skills development) **12. Stakeholders' engagement (High-level authorities)** 15. Team Development Models **16. Theory U (system transformation/ awareness)** **17. Transformative sustainable learning (TSL)**

Table 6. Elements and features extracted sum up

The **Table *6*** above, as mentioned above, highlights the elements and characteristics that were included by each of the participants who were interviewed. After an analysis from a point of view that seeks to question the relationship between PM and SE, the elements were extracted and classified according to each of the 18 interview sessions conducted. The 19 clusters in which they are arranged were created by the author after multiple iterations in the review of the problems, obstacles, suggestions, own use and/or lack of, certain concepts that are linked to the source of the classifications.

In each of the interviewees' sections, the elements are individually highlighted in bold or not, which seeks to differentiate between whether the cluster was explicitly named in the interview, either with the name of the cluster or of the multiple elements that make it up (i.e., some of the 10 PMBoK areas), or not. In case the elements were not explicitly named in the interview, they are included as an inducement of the author's reasoning for the interviewee's words, making a relation of the analysed concepts from a different point of view, or they also emerge as a mere direct solution to the issues raised.

3.3 Sum up of relevant aspects

After filtering and exposing each of the clusters, from the analysis carried out, another **Table** *7* was drawn up in which data pertaining to each of the sections interviewed is presented. In the following columns, three aspects are examined: 1- the self-definition of the activities carried out by the research centres as ID and/or TD; 2- the experiences they share as in cases of success, failure, and/or obstacles to overcome; 3- the use of tools belonging to PM, and in the positive case, the awareness of the participants of their use.

	Self-definition		Experiences to share				
Participants	ID	TD	OBSTACLES	SUCCESS	FAILURE	PM Tools	Awareness
1	YES	YES	NO	NO	YES	YES	YES
2	YES	YES	YES	YES	YES	YES	NO
3	YES	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	NO	YES	YES	NO
5	YES	NO	YES	NO	YES	YES	NO
6	YES	YES	YES	YES	NO	YES	NO
7	YES	YES	YES	YES	YES	YES	NO
8	NO	NO	NO	NO	YES	NO	NO
9	YES	NO	YES	NO	YES	YES	NO

10	YES	YES	YES	YES	YES	YES	YES
11	YES	YES	YES	YES	YES	YES	YES
12	YES	NO	YES	YES	NO	NO	NO
13	YES	YES	YES	YES	YES	YES	NO
14	YES	YES	YES	YES	YES	YES	NO
15	YES	NO	YES	NO	YES	YES	YES
16	YES	YES	YES	YES	NO	YES	YES
17	YES	NO	YES	YES	NO	NO	NO
18	NO	NO	YES	YES	YES	NO	NO
Totals	**16**	**11**	**16**	**12**	**14**	**14**	**6**

Table 7. Recognition of elements (Y/N)

It can be seen in the **Table** *7* above, that each of the columns are simply filled in according to the positivity ("YES") or negativity ("NO") of the statements analysed. In the first case, the representatives of the research centres were directly asked whether they define their activity as ID/TD and why, so it was only necessary to collect this information. In the second section (shared experiences), based on the statements of each participant and each section: obstacles, cases of success, cases of failure, the explicit testimony was placed as long as it referred to the concrete case in positive or negative (YES or NO). Finally, in a feminological way, the aim is to approach reality starting from the individual's internal frame of reference, seeking to reveal the meanings that individuals give birth to from their experiences, thus interpreting and inducing (depending on whether the subject makes it explicit) the use, or not, of PM tools and the awareness that the subjects have of this.

3.4 Transversal Third Level Analysis

In the following section a third level transversal analysis will be performed, seeking to make the concordance that should exist between what in theory (SLR) is said to be done in order to move towards a transition in sustainability in education, in second level what people say they do (interviews), that is, the tale of practice, and try to see how all

this coordinates (or should) with what is being done in the different research centres, making research on their websites.

In the different sites of the organizations (RCs) to which our participants belong, we can differentiate some selected sections to contrast as a third level, as mentioned above, to find out what each RC is really doing in terms of this transition. Most of the RCs are merely universities, where the members are part of different teams/departments performing ID/TD activities that are of our interest for the development of this study.

After an exhaustive review of each of the websites of the different RCs, some main and common points were extracted and reflected in the **Table *8***, which allow the author to perform a cross-sectional analysis of the situation, in terms of the objectives set out in the research practice.

The search in the sites was mainly maintained, but access was also obtained to most of the strategic plans of the universities, which were a powerful source of information for the accomplishment of the analysis.

Research Centre	University	Mision/ Vision/ Objectives	Research/Education Areas	Projects
CENSE	*NO*	Center for Environmental and Sustainability Research, promotes interdisciplinary research in environmental sciences and engineering, focusing on the interaction between human and ecological systems, to promote sustainable development. The Centre is the research branch of a wider organization including researchers, students and staff from the NOVA School of Science and Technology, plus a number of affiliated organizations.	The different research areas are divided as follow: - Bioresources and Green Technologies - Computation for Sustainability - Ecological Economics and Environmental Management - Energy and Climate - Sustainable Water Sanitation, Wastes and Resources Recovery	Involved in multiple R&D projects supported by the European and National Funding Programs. Some of them are related with: Establishment of Integrated Land Use systems, Safeguarding and improvement of biodiversity functions, Climate change mitigation, Producing cutting-edge climate projections and seasonal forecasts, Translating climate data into energy system and power indicators through machine learning and modelling, Engaging the energy, environment and climate communities, Producing a web service application co-developed with end users, among many others.
Istituto per la Ricerca Sociale (IRS)	*NO*	IRS is a wholly independent, non-profit cooperative. They fine-tune their products to meet the specific needs of a wide target of clients, both public and private. This is made possible thanks to the wide spectrum of competencies available within the Institute. Their work is based on a multidisciplinary, fully integrated approach. IRS is part of various international research centre networks and closely collaborates with prestigious universities and qualified experts.	The different research areas are divided as follow: - The Labour Market and Industrial Relations - Administrative Policies - Training and Labour Policies - Social and Health Services and Policies - Urban, Environmental and Territorial Policies - EU and International Affairs Unit - Management Models and Complex System Compliance	They work with a wide network of alliances, that made possible the development of their projects. Among the organizations which are part of this network of clients, partners and sponsors, we can highlight many international organizations, national institutions, regions and autonomous provinces, provinces, municipalities, healthcare institutions, universities, research centres, chambers of commerce, financial institutions, public and private firms, foundations and associations.

Universitat Politecnica de Catalunya	SI	To become a unit of reference in promoting, monitoring and supporting the internationalisation process of the university community and governing bodies. To be a technical point of reference for services in this area outside the UPC. Values: Social responsibility Equal Opportunity Sustainability Cooperation and Solidarity Techno humanism	Areas of expertise: - Energy and environment - Biomedical engineering - Advanced manufacturing - Infrastructures - Information and communication - Logistics and mobility - Materials - Chemical and food industry - Urban planning and sustainability	Developing a proposal for a system of innovation in management and public service activity, aimed at improving the services offered at the University, the processes we use, or the knowledge we apply, creating opportunities, facilitating resources, enhancing capabilities and promoting a culture that favours it.
University of Gothenburg	SI	Sustainable development External relations and collaboration Provision of skills Physical and digital environments Sustainable work and student life Governance and organization	The different research areas are divided as follow: - Sustainability and environment - Health and medicine - Culture and languages - Science and IT - Society and economy - Education and learning	Applying on the university search filter the term "project" yields 792 results, while applying the "sustainability" filter 420 results appear, including projects of sustainable communities of practice, sustainable finance, sustainability and software, sustainable learning of statistics, among many other topics.

La Trobe University	SI	Mission: "We are a university known for making a positive difference in the lives of our students, partners and communities. We will become an even more valued and relevant university because of the way we respond to their needs at this time of great local and national challenge." Strategy: "Our aim is to emerge as a more resilient, future-focused and necessarily more efficient institution that will thrive in a post-COVID world by being more sharply focused on the needs of our community, and by playing to our strengths in teaching and research."	They work collaboratively across disciplines and with partners to develop fresh ways of thinking and conducting research. Their goal is to use their areas of strength to undertake high-quality research. Their research is focussed on five priority areas linked to the United Nation's SDGs: - Sustainable food & agriculture - Resilient environments & communities - Healthy people, families & communities - Understanding & preventing disease - Social change & equity	The vision and strategies contemplates: Students: Reshaping to better meet student needs Teaching: Improving quality and accessibility Research: Focusing on our strengths, impact and global challenges Industry and government: Becoming the Strategic Partner of Choice Our regions: Transforming our communities International: Internationalised in everything we do. Our people: An empowered workforce inspired by our values. Improving efficiency and productivity.
Former QOT	NO	Produce high-quality online professional learning. They engage topic experts from the early childhood sector to translate research and identify best practice to develop professional learning that 'speaks the language of educators and teachers' and can be used across the diversity of settings educators may be working in. Is designed to help educators gain a thorough and practical understanding of standards, frameworks and research about quality practice. It is also designed to be accessible, affordable and contemporary to ensure quality professional learning is available, no matter where and when it is needed.	The different research areas are divided as follow: - Collaboration and Partnership - Health and Wellbeing - Leadership and Management - Pedagogy and Curriculum - Planning, Documentation and Research - Rights, Advocacy and Inclusion - among other subclassified areas such as: essentials, or free courses in more general topics	ECA Learning Hub have: - Webcasts - Webinars - Modules - Online Professional Learning Guides - Customised professional learning and consultancy - Communities of Practices: where all the members are capable to learn with and from each other. By exploring new ideas, sharing resources and lived experiences you will become part of a vibrant learning community.

University of Delft	SI	Vision: DU contributes to solving global challenges by educating new generations of socially responsible engineers and expanding the frontiers of the engineering sciences. Mission: To perform world-class research by combining science, engineering and design in a socially responsible manner; To develop and enhance the expertise of tomorrow's engineering leaders and educate professional, high-level and responsible engineers throughout their careers; To help to develop and deliver technology-driven, innovative solutions to societal problems through collaborations with leading national and international partners whilst being firmly rooted in Delft; To continuously improve our collective effectiveness, performance and organisational resilience through the principles and practice of professionalism, collaboration and openness.	Research faculties are divided as follow: - Aerospace Engineering - Applied Sciences - Architecture and the Built Environment - Civil Engineering and Geoscience - Electrical Engineering, Mathematics and Computer Science - Industrial Design Engineering - Mechanical, Maritime and Materials Engineering - Technology, Policy and Management	The particularity of this university is the degree of technological development that is incorporated in the knowledge of its professional team, the investment and the space they dedicate to it. After education and research, technology transfer is the third core task. TU Delft sees it as its social task to propose ground-breaking technical-scientific solutions that contribute to impact for a better society. There is a special focus on innovation and social impact. We work with artificial intelligence in many research and development projects, and we also encourage entrepreneurship, connecting it with innovation and financing, with the university being a fundamental support for this. The network that the university has and continues to create is one of the key points for the good development of all these activities.

Politecnico di Torino	SI	Values and principles: pursuing the goal of contributing to the socio-economic development of its territory and Country; educating competent and responsible professionals; contributing to the growth of knowledge and innovation; disseminating their research results to the production system and sharing the culture they have generated with society as a whole. Polito's vision is centred on being an academic community committed to generating and sharing "polytechnical knowledge" for effective and sustainable development of society at global, national and international level.	The two souls characterizing Departments are research and teaching. Departments indeed carry out duties of coordination, promotion of research, organization and management of the teaching activity , following the recent reform of the University system: - Architecture and Design - Control and Computer Engineering - Electronics and Telecommunications - Environment, Land and Infrastructure Engineering - Management and Production Engineering - Mechanical and Aerospace Engineering - Structural, Geotechnical and Building Engineering - Mathematical Science - Energy - Regional and Urban Studies and Planning - Applied Science and Technology	Take the opportunity to turn the interdisciplinary collaboration among different technological and scientific fields into something more systematic. This strategic objective was put into action through the establishment and the funding dedicated to the so-called Interdepartmental Centres. Researchers interacted and cooperated with the aim of: Combining competences and producing knowledge in the field of the so-called breakthrough technologies; Making the reputation and the visibility of university grow in the areas of strategic interest at a local and a national level; Enhancing relationships with the most prestigious international institutions; Strengthening partnership relationships with the main players of the social and economic system.

Universitat Internacional de Catalunya	SI	UIC puts students at the centre and makes them the protagonists. This is its commitment to them. It responds with personalized treatment, classes in small groups, proximity to the teaching team and support services. Tailor-made attention, comprehensive approach to each student, constant professional connection and innovation in teaching and research methods. Agreements are in place with more than 50 companies and institutions that rely on UIC's centres, chairs and institutes. We are connected to society and business. Teaching is of a practical nature, taught by professors who work as active professionals, and is complemented by a professional internship program.	The UIC has 25 research groups within the following fields of knowledge: - Arts and Humanities - Social and Legal Sciences - Health Sciences - Engineering and Architecture	UIC supports the 2030 SDG Agenda. In this sense, we have implemented the 2016-2022 Strategic Sustainability Plan in the areas of organization, teaching, research and environmental management, to transform campuses towards sustainability and contribute our grain of sand for change.
Windesheim	SI	Windesheim's mission is to make an active contribution to an inclusive and sustainable society. They strive to do so by educating valuable and principled professionals and by conducting practice-oriented research. The following three ambitions determine Windesheim's Strategic Plan for the upcoming years: 1. Each student has his/her own learning pathway that is personal, challenging and flexible; 2. The research at the university focuses on an inclusive and sustainable society; 3. To improve the transfer of students through the education chain.	The four main pillars in which the university's research is based on are: 1- Inclusive Society; 2- Technology for Society; 3- Future-oriented and Sustainable Entrepreneurship; 4- Vitality, Well-being and Health. Practice-based research at universities of applied sciences is research at the core of society. And this research is carried out together with partners from the field. Results find their way into professional practice and to future professionals via the study programmes.	Windesheim Honours College works intensively on the SDGs. The SDGs are widely integrated throughout their programme. The SDGs are present in their courses, projects and semesters like the Value Creator. For 2020-2021, their programme has 36 projects divided amongst students in Year 1, Year 2, Year 3 and year 4.

ERSILIA Foundation	NO	ERSILIA is as a private non-profit foundation devoted to promote inter and transdisciplinary knowledge in order to enhance our capacity to meet contemporary global (urban) challenges. ERSILIA: - Design strategies for inter/transdisciplinary learning and research; -Facilitate workshops and training courses; - Encourage knowledge alliance between businesses, universities, research centres and civic associations; - Promote the dissemination and communication of scientific and humanistic knowledge.	It is possible to highlight some projects which are being developed by ERSILIA related to: 1. INTREPID is a 32 country network with the overall aim to better understand how to achieve more efficient and effective interdisciplinary research in Europe, in order to enhance our capacity to meet contemporary global (urban) challenges characterised by increasing complexity and uncertainty; 2. BUILD Solutions: "Our aim is to boost innovation, entrepreneurship and subsequent market uptake of intelligent living, biotech and biomimicry solutions to help green cities"; 3. ATHIKA: Exploring how a humanistic dimension can be introduced to engineering education in relation to healthcare-related technologies; among others	It is crucial to facilitate urban education that is cross, inter or trans-disciplinary; based on global but also on local knowledge and engaged with live projects taught through active learning approaches defined as challenge-based, or project-oriented that facilitate overcoming traditional barriers: the institutional and discipline-based contexts.

Università La Sapienza	SI	Sapienza is committed to achieving the 17 UN Sustainable Development Goals (SDGs) through its educational activities, research, third mission (service to society or outreach) and cross-cutting policies. Sustainability activities are explained on the Sustainable Sapienza portal and in the Sustainability Report published every year.	Sapienza is organised into 11 faculties, each of which oversees various departments: 1- Architecture; 2- Arts and Humanities; 3- Civil and Industrial Engineering Economics; 4- Information Engineering, Computer Science, and Statistics; 5- Law; 6- Mathematics, Physics, and Natural Sciences; 7- Medicine and Dentistry; 8- Medicine and Psychology; 9- Pharmacy and Medicine; 10- Political Science, Sociology, and Communication Science; 11- School of Aerospace Engineering.	The university carry out a wide variety of projects and the management of a NGO, among them we can find: - Fondazione Roma Sapienza is an independent and autonomous non-profit foundation. - 2020 Horizon Projects with Pillars on: 1- Excellent Science; 2- Industrial Leadership; 3- Societal Challenge; among others. - Orientation projects: A bridge between school and university - Saperi&Co Project: plans the development of an infrastructure dedicated to research and innovation.
University of Lisbon - ICS	SI	ICS contributes to Changing Societies: Legacies and Challenges - a research agenda that lead the way to a new era as a research unit. This strategy is shaped by the need to respond to emerging societal trends and social issues in a changing and unstable world (namely those concerning Inequality, Citizenship and Sustainability), taking into account both its structural underpinnings and short-term dynamics.	The research groups are divided on areas such as: 1- Life course, inequality and solidarity; 2- Empires, colonialism and post-colonial societies; 3- Environment, territory and society; 4- Identities. Cultures, vulnerabilities; 5- Memory, history and society; 6- Regimes and political cultures; 7- Social and political attitudes: resilience and change.	ICS is currently carrying out many different projects, including thematic and areas such as: - Ethics; - Sustainable Meals; - Justice; Intergroup time bias in social relations; - Sustainable urban requalification; - Gender and women influences, among many others.

Universidad Pompeu Fabra	SI	Mision: To train, by means of a rigorous, innovative and personalized educational model, people with a solid scientific and cultural background, general skills that can be adapted to the changes and challenges of society, and the specific skills they need to successfully carry out their life projects. Vision: A leading research university, dedicated to public service. A flexible, effective and personalized university. A financially sustainable, public university. An urban university, focused on the challenges. Values: Pluralism, Autonomy, Dynamism, Commitment, Fairness, Rigour, Accountability.	From the UPF they divide the university in five different strategic action areas: 1- Outreach and reputation; 2- Teaching; 3- Research; 4- Finance and governance; 5- Community. The research area is divided on multiple departments: 1. Experimental and Health Sciences; 2. Political and Social Sciences; 3. Communication; 4. Law; 5. Economics and Business; 6.Humanities; 7.Information and Communications Technologies; 8. Translation and Language Sciences.	Cross-cutting themes: In response to the changing global scenarios, UPF have identified certain key transformational elements to facilitating their development in the coming years. 1- To become a pre-eminent university in Europe with a global reputatio; 2- To become a socially responsible and sustainable universityc; 3- To become a networking university.
Universidade Aberta	SI	Through its virtual pedagogical model, Uab promotes a quality education for all. Is a virtual pedagogical model which adopts the principles of distance learning valuing the flexibility and autonomy of the learning process of open education developing open educational practices and contents of online education incorporating the dynamics and instruments of web technologies and a networked society. Students and their specificities are the core of the educational process. Multiple systems of formal and informal learning, with academic management are integrated.	Curricular Areas: 1. Environment; 2. Management; 3. Informatics and Technology; 4. Mathematics; 5. Education; 6. Humanities; 7. Social Science; 8. Arts; 9. History; 10 Lifelong Learning; 11. Training for Digital Citizenship	Universidade Aberta (UAb) is the single public distance education university in Portugal. Due to its purpose, UAb uses comprehensively, in its teaching activities, the most advanced technologies and methods of Distance Learning, without geographical borders or physical barriers, and giving special emphasis to the expansion of the Portuguese language and culture within the Lusophony space. UAb offers higher education anywhere in the world and Lifelong Learning study programs.

University of Bilbao	SI	Mission: To meet the higher education needs of society, carry out quality research generating knowledge through cooperative work, transferring it to the territorial environment and the international community. To be a university open to the world, offering a free space for reflection and critical thinking. Vision: - To provide quality training and enable students to respond adequately to local and global challenges and to act ethically and creatively in the environment; - To strengthen the international research profile to face new social, cultural, economic and environmental challenges, with a vocation for leadership in the transformation of society through knowledge; among others	It is possible to highlight the existence of a sector dedicated exclusively to sustainability and social commitment, thus classifying the contribution of the different programs and actions developed at the university towards the SDGs. The following are the different institutes included in the structure of the university: - Process Research and Development; - Criminology; - Applied Business Economics; - Public Economics; - Cooperative Law and Social Economy; - Microelectronic Technology; - Social History; - Development Studies and International Cooperation; - Polymeric Materials; - Logic, Cognition, Language and Information; - Basque Language; - Ancient Sciences.	SE: The UPV/EHU promotes experiential learning and collaboration, to learn about sustainability by practicing and sharing from different knowledge. The strategic axes, areas of action on which the university will concentrate its activities, are: 1- Training; 2- Research; 3- Relationship with society; 4- People; 5- Governance and resources. For which, each one is defined with its objectives and specific actions, as well as indicators to measure its implementation and impact.

Table 8. Third-level of transversal analysis: research centres' websites analysis

CHAPTER 4: DISCUSSION OF RESULTS

In this chapter, a discussion about the findings and how these help in achieving the stated objectives of the thesis is executed. In the following passages, the discussion will focus on the data filtering and the infographics produced, based on the results obtained from the analysis carried out. Although the above analysis gives a general overview, this section will attempt to make a concise and visually interpretable presentation, as well as create a range of options for the resolution of the issues raised by the interviewed parties.

The analysis includes the statement by the different participants of the self-identification of their activities as inter- and/or trans- disciplinary in their respective research centres. Another aspect to underline is the exposition of cases of success, failure and obstacles that they have had to overcome in the different cases analysed, with respect to the development of this type of activities (ID/TD). Finally, the use of elements and characteristics belonging to the world of project management, which are integrated consciously or unconsciously (this distinction is made) in the work carried out by the professionals of the research centres, is identified and differentiated.

4.1 Results' analysis exposition

The following information was extracted from the **Table *7*** which was exposed above:

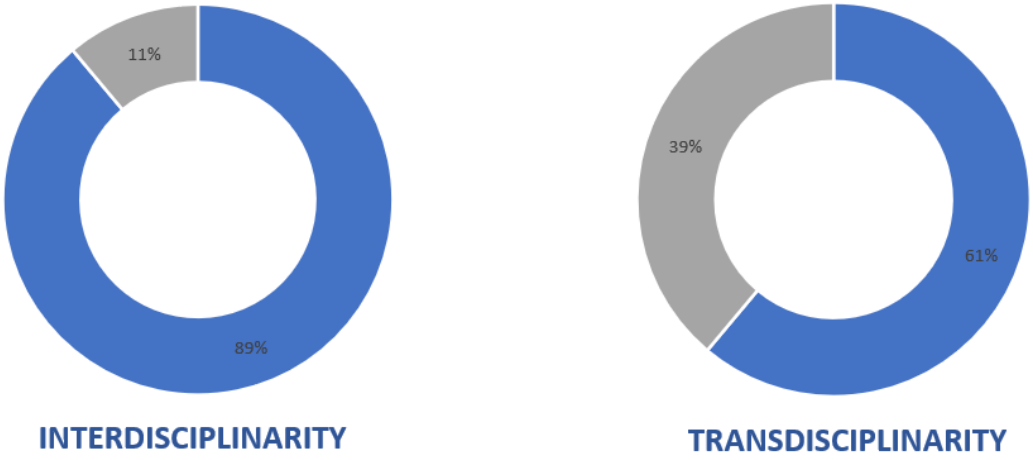

Figure 6. ID/TD activities self-declaration

Firstly, the **Figure *6*** shows that the vast majority of respondents (89%) self-define their activities just as ID, while only an above-average share (61%) is able to call it as really TD. Now, taking into account that it is a small sample (n=18), but that the interviewees belong to ID/TD research centres and are therefore professionals of high value for this type of research, we can then induce and see clearly on the testimonies, that multiple issues still need to be overcome to develop this type of activities leading to a real, feasible sustainability education (SE). Furthermore, the difference between the number of professionals who can develop their activities as TDs makes it clear that it is a challenge to include and generate a real commitment to third parties (i.e., citizens) who can be involved in the projects.

These results suggest that there is a need for the inclusion of techniques, tools, committed and knowledgeable people, to enhance the development of such activities that lead to the sustainability objectives that exist today worldwide.

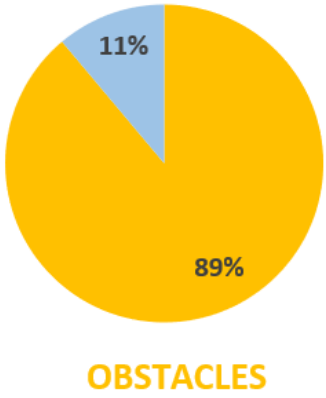

Figure 7. Participants who have had to overcome obstacles.

Secondly, with regard to the experiences that have been shared, it can be observed in the **Figure** *7* that the largest proportion of participants (89%) stated that they have had barriers that have hindered the development of concrete projects, since if we analyse from the point of view of particular obstacles, all the participants have identified multiple barriers that they have to deal with.

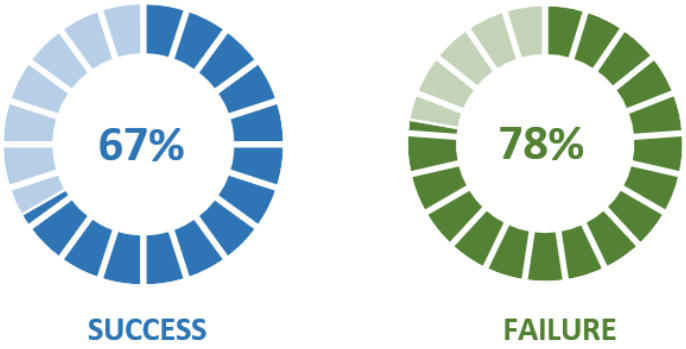

Figure 8. Experiences of Success/ Failure

Then it is interesting to analyse in the **Figure** ***8*** how the reported cases of failure are higher than the reported cases of success, with 78% versus 67% respectively. This shows that, on the one hand, there is still a lot of work to be done to continue with this transition, which is why the aim is to provide the most appropriate tools and methods

from the PM that are applicable and help to strengthen the effort that is being made, and that remains to be developed. On the other hand, the results show that a lot of work is being carried out with this approach, directed towards the same objective, so it is important to highlight and bring these cases together to form a solid network that contributes to the agreement and fights against the desolation of those who do not have the necessary support but do have the energy and intentions to apply it.

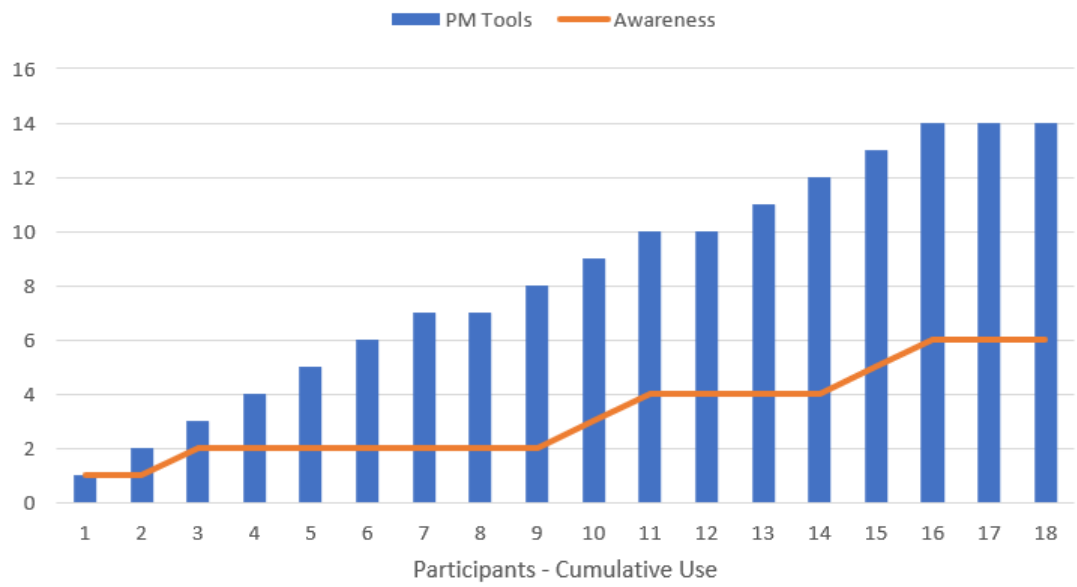

Figure 9. PM tools and its use awareness

In the previous **Figure *9***, the author has perceived how the different participants have expressed how they use PM tools in their professional work activities, and a distinction has been made as to whether each of those who use them do so consciously or no. The blue bars show cumulatively the number of participants who use PM tools (78%), while the orange line shows who of them apply them consciously (33%).

This shows that, on the one hand, PM is potentially related to SE, and that its tools can enhance the development and results obtained in a transition to sustainability. Furthermore, it is necessary to raise awareness and instruct those who are responsible and protagonists in this process, so that the integration of PM is planned and managed

instead of unconscious, whereas the transformation is the outcome of a process that includes consciousness and a broadening of perspective (Biester et al., n.d.), in this manner the results can also be seen and measured in a clearly defined form.

One of the purposes of the study is to provide the necessary tools to face the problems and challenges that have arisen, as well as advice for the implementation of a transformative learning plan, which generates individual and collective empowerment, leading to new insights and greater competence action.

4.2 Tools use recommendation

Based on what was collected in the interviews, with regard to what the participants expressed as characteristics that they used, belonging to the PM, related to the SE and in pursuit of the transition of a system with greater roots in the principles of transformation towards sustainability, in complement with the problems and obstacles declared, a learning **Table *9*** was conjectured in which the characteristics belonging to one, the other or both fields of reference are included. For each of these elements, a broad definition was chosen in order to include them in the toolkit, so that they can then be used as a whole to address the system issues in which each actor is involved.

With a view to meeting the objectives set out, the aim is to encourage and push the protagonists of the systemic transformation on which we are working to integrate both worlds, both FP and SE, one into the other and vice versa, generating feedback from which both parties can learn and feed off each other in order to grow, without losing the bases and roots but generating a propagation of knowledge without limits in the limited monodisciplinary thinking.

Nº	*Project Management elements/ features*	*Sustainability Education elements/ features*	*Definition Chosen*	*Nº of Interviews*
1	*Agile management methodologies*		Is about bringing people, processes, connectivity and technology, time and place together to find the most appropriate and effective way of working to carry out a particular task. It is working within guidelines (of the task) but without boundaries (of how you achieve it). Encourages flexible working, continuous improvement and team responsibility, focusing on performance and outcomes which are mutually beneficial to the worker, their team and the organisation. [a]	**6**
2	*Co-creational and collaborative work*		Constitute a direct part of the production process, they do not include all inputs by citizens that affect the overall planning, design and delivery of a service, but focus on the direct input of citizens during the production phase. Furthermore, they both refer to collaboration between professionalized service providers in public agencies and citizens. [b]	**10**
3	*Curricula and organizational culture sustainability co-adapatation*		Implementation of structural changes in the system to allow for greater flexibility, input from diverse viewpoints and joint departmental work. The aim is to overcome administrative barriers, deal with the bureaucracy of the system, allowing for adaptations that respond quickly to both internal and external factors. Students will be protagonists of the educational process, generators of change and creators of future value through educational processes based on projects and problems.	**9**
4	*Governance Management*		Governance ensures that stakeholder needs, conditions, and options are evaluated to determine balanced, agreed-on enterprise objectives to be achieved; setting direction through prioritization and decision making; and monitoring performance and compliance against agreed-on direction and objectives. Management plans, builds, runs, and monitors activities in alignment with the direction set by the governance body to achieve the enterprise objectives. [c]	**7**
5	*Leadership (inclusive and distributed)*		Leaders who exhibit openness, accessibility, and availability in their interactions with employees and emphasizes participative and open leader behaviours. These behaviours send clear signal that innovation is welcome and appreciated and makes it directly and consistently conducive to team innovation. [d]	**8**

			On the other hand, distributed leadership challenges this view of leadership as a solely vertical process (...), and instead focuses on the mechanisms through which diverse individuals contribute to the process of leadership in shaping collective action making emerge it and being the source to this process. [e]	
6	*Motivation & Incentivisation*		Inclusion of a process by which a provider is motivated to achieve extra 'value-added' services over those specified originally and which are of material benefit to the user. These should be assessable against predefined criteria. The process should benefit both parties. [f] The contribution of recognition in multiple manners: symbolic, monetary, of the activities and results achieved, with the development of attributions both internally (storytelling, creativity development) and externally (society sensitisation, consciousness generation), in the system, are indispensable and stand out among the needs currently raised.	**9**
7		*Mixing Art-Science*	Creating, moving from art, enables us precisely to produce that reorganization of the imaginary with the real, through links between what feelings, emotions, and organized mental activity tell us. As in science, in art the method is also fundamental. And, as might be expected, it is a different method, which guides different processes, and produces responses of another order than those of scientific knowledge. [g] Usable tools such as creativity and mindfulness development are named and integrated on this journey.	**3**
8	*Networking*		The process of developing and activating your relationships to increase your activity, enhance your knowledge, expand your sphere of influence or serve the community. [h]	**8**
9	*Personnel Training*		Experts from various field are required to work alongside one another to implement long-term management and implementation solutions, integrating political, technical, and experiential knowledge and strong interpersonal skills to communicate this knowledge. [i] So, is fundamental the development of competences, the integration of support staff & trained teachers, with expertise, background and not give just soils training.	**6**

10	*Program Management Tools*		The difference between projects and programs has been ignored or confused by many people for too long. Programs focus on the coordination of a number of related projects and other activities, over time, to deliver benefits to the organization. Program management is about maximizing the benefits realized with constrained resources in a changing environment. [j] It is essential to include tools that take into account the whole system we are analysing, from and to, in order to address the whole system, and to fight against isolated actions and programs. It is sought to define the roles and levels of interaction of the system, to have clear the responsibilities of each particular department/participant.	**9**
11	*Soft Skills*		A skills inventory summarizes the skills, education, and experiences of current members of the organization (students, teachers, employees, etc). The process for preparing the skills inventory will vary depending on the size and complexity of the system. It is possible to identify any gaps that exist between the skills, knowledge and experience that the real-world is needing versus what the systems' human resources are delivering. [k] Is highlighted the importance of soft skills development on current students.	**5**
12	*Stakeholders' engagement*		Stakeholder engagement is the systematic identification, analysis, planning and implementation of actions designed to influence stakeholders. [l] A stakeholder engagement strategy identifies the needs of key groups, and the sponsor plays a vital role in ensuring those business needs are met. High-level authorities' engagement is a crucial task to achieve, applying engagement strategies and plans, in order to lead our endeavours to their aim.	**12**
13		*Sustainability Reports*	Tool used to assess the state of an organization's social, economic, and environmental dimensions, as well as to communicate its advances to stakeholders. It consists of five generic phases: preparing, connecting, defining, monitoring, and reporting. [m] It is necessary to make *sustainable activities* be in the main focus of organizations, and not just as "extra activities".	**2**

14		*Design-Thinking & Problem-Based Learning*	The complex processes of inquiry and learning that designers perform in a system context, making decisions as they proceed, often working collaboratively on teams in a social process. [n] PBL is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts. can promote the development of critical thinking skills, problem-solving abilities, and communication skills. [o]	**11**
15	*Team Development Models*		Use of models for group formation as Tuckman's Model, which consists of distinct stages of group formation: forming, storming, norming, performing and mourning. They represent the necessary and inevitable stages from facing challenges, tackling problems, finding solutions and planning work to ultimately delivering results as a team. [p] In this context, is also remarkable to build interdepartmental connection in institutions to spread the knowledge and enhance the work and results.	**5**
16	*Theory U*		Theory U makes a distinction between the different ways that action and attention come into the world. It draws our attention to the blind spot in leadership today: the "interior conditions," the sources from which we operate both individually and collectively. Also, Theory U draws our attention to that blind spot—to the invisible source dimension of the social field, to the quality of relationships that we have to each other, to the system, and to ourselves. [q]	**13**
17		*Transformative Sustainable Learning*	Is a series of learning objectives corresponding to cognitive (head), psychomotor (hands) and affective (heart) domains of learning that facilitate personal experience for participants resulting in profound changes in knowledge, skills and attitudes related to enhancing ecological, social and economic justice. TSL contributes to the broad fields of sustainability education and transformative learning by articulating the relationship of these pedagogies to each other and to the organizing principle of head, hands and heart. [r]	**6**

18	*Sustainable Project Management (SPM)*		The planning, monitoring, and controlling of project delivery and support processes, considering the environmental, economic, and social aspects of the life cycle of a project's resources, processes, deliverables, and effects, with the aim of creating benefits for stakeholders in a transparent, fair, and ethical way that includes proactive stakeholder participation. [s]	**2**

Table 9. Learning elements from PM/ SE

Note of references:

[a](Marder et al., 2021).; [b](Brandsen et al., 2018).; [c](Industries et al., 2002).; [d](Ye et al., 2019).; [e](van Ameijde et al., 2009).; [f](Bower et al., 2002).; [g](Novo, 2004).; [h](Misner Ivan, 2012).; [i](Johnson et al., 2019).; [j](Weaver, 2010).; [k](Tanner, 2020).; [l](Management Association for Project, 1390).; [m](Yáñez et al., 2019).; [n](Melles Galvin, 2020).; [o](Bayat & Tarmizi, 2012).; [p](Wageningen Centre for Development Innovation, 2012).; [q](O. Scharmer, 2018).; [r](Sipos et al., 2008).; [s](Toljaga-Nikolić et al., 2020).; [t](Richardson, 2020).

On the last column of the **Table *9***, is differentiated the frequency with which each element was named or induced by the participants or the author respectively, in the different interviews. It gives us an idea of the importance that each clustered element has in the development of the journey and how it is being used by the different centres.

The frequency of mention and use of the elements can also be seen in the **Table *10***, while a prominent reference is made to whether the terms were expressly stated, or whether they appear as an account of an inducement on the part of the author, or as a tool to be used in the approach to certain specific problems.

It can be seen that most of the elements have not been explicitly mentioned by the interviewees but have been expressed terms that have been grouped together as part of clusters, formed by the author, based on what was extracted from the statements made. Among the clusters with the greatest impact on the study, Theory-U, stakeholder engagement and the cluster that integrates system- and design thinking & PBL stand out. To highlight the elements with the greatest frequency of repetition, we see that there is a combination of hard methodologies, typical of PM, with new, softer theories, with a greater focus on the person and the being, an integration of the "social technology of presencing" with the power of negotiation and convincing strategies created to manage the parts belonging to a system.

With respect to **Table *9***, it is worth noting the differentiation made in the elements with respect to whether they belong to one of the sectors, either SE or PM, by including them in their respective columns. We can see how some belong to and are specified in only one of the columns, but there are also elements that belong to both worlds, that is, transversal elements that are related to, apply from and are part of both PM and SE. This correlation, which gives us a kick-start to see the already existing relationship that we are studying between the preconceived concepts, gives a more solid support to the studies.

Nº	*PM & SE elements/ features*	*Cluster*	*Abreviation*	*Number of Interviews*	*Explicit*	*No Explicit*
1	**Agile management methodologies**	**SL**	AGM	6	2	4
2	**Co-creational and collaborative work**	**GL**	CCW	10	7	3
3	**Curricula and organizational culture sustainability co-adapatation**	**SL**	COCA	9	2	7
4	**Governance Management**	**SL**	GM	7	0	7
5	**Leadership (inclusive and distributed)**	**IL**	Le	8	2	6
6	**Motivation & Incentivisation**	**IL**	M&I	9	4	5
7	**Mixing Art-Science**	**GL**	MA-S	3	3	0
8	**Networking**	**IL**	Ne	8	3	5
9	**Personnel Training**	**IL**	PT	6	1	5
10	**Program Management Tools**	**SL**	PMT	9	1	8
11	**Soft Skills**	**IL**	SS	5	1	4
12	**Stakeholders engagement**	**GL**	SE	12	4	8
13	**Sustainability Reports**	**SL**	SR	2	0	2
14	**System- and Design-Thinking & PBL (Problem-Based Learning)**	**GL**	DT&PBL	11	8	3
15	**Team Development Models**	**GL**	TDM	5	2	3
16	**Theory U**	**SL**	U-T	13	3	10
17	**Transformative Sustainable Learning**	**IL**	TSL	6	0	6
18	**Sustainable Project Management (SPM)**	**SL**	SPM	2	0	2

Table 10. Explicitation of usage of PM/ SE elements

From the **Table *10*** it is possible to extract information that is presented more clearly in the following **Figure *10***, where the cumulative repetition of each of the terms is displayed. We can highlight Theory U as the framework and change method that was most often mentioned and/or recommended as a problem/obstacle solver. In second place we find stakeholders engagement, a strategy used in PM and about which there is a large amount of theory and experiences studied, which serve as a guide when applying it in different types of projects. The third of the most mentioned is the cluster that was designed integrating ST, DT & PBL, which seemed interesting when dealing with problem- and project-based learning methodologies, with ST and DT, which are not clearly defined methods or concepts, or integrating only one perspective, but a set of interconnected, partially overlapping, partially complementary, partially contradictory aspects and theories. The conjunction of this elements in a cluster is a potential tool to be taught and learned in order to deal with negative aspects as volatility, uncertainty, complexity, among others which appears in almost any type of project.

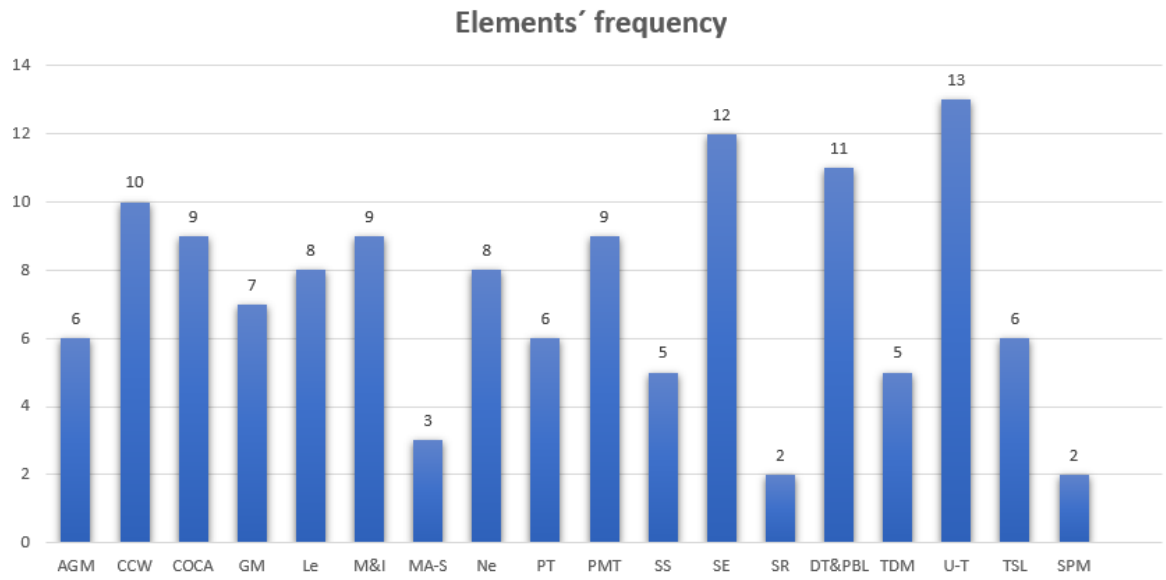

Figure 10. Repetition of PM/ SE elements

With regard to the rest of the aspects studied, we see that we have a gradual decline among the 18 clusters formed. After the 3 mentioned above at the top of the list, we find very interesting aspects and concepts such as collaborative and co-creational work, which is mentioned very often, and which needs to be planned and developed, in order to face "wicked" social, economic and environmental issues.

Collaborative learning allows "new" knowledge and understanding to emerge and become actionable in and through actual interaction, competition, struggle and collaboration. After that we find other features such as motivation and incentivisation, program management tools, leadership features development, among others, which have a great power at the time of face complexity, uncertainty and to develop new and well-adapted plans for education and the societal transition on sustainability.

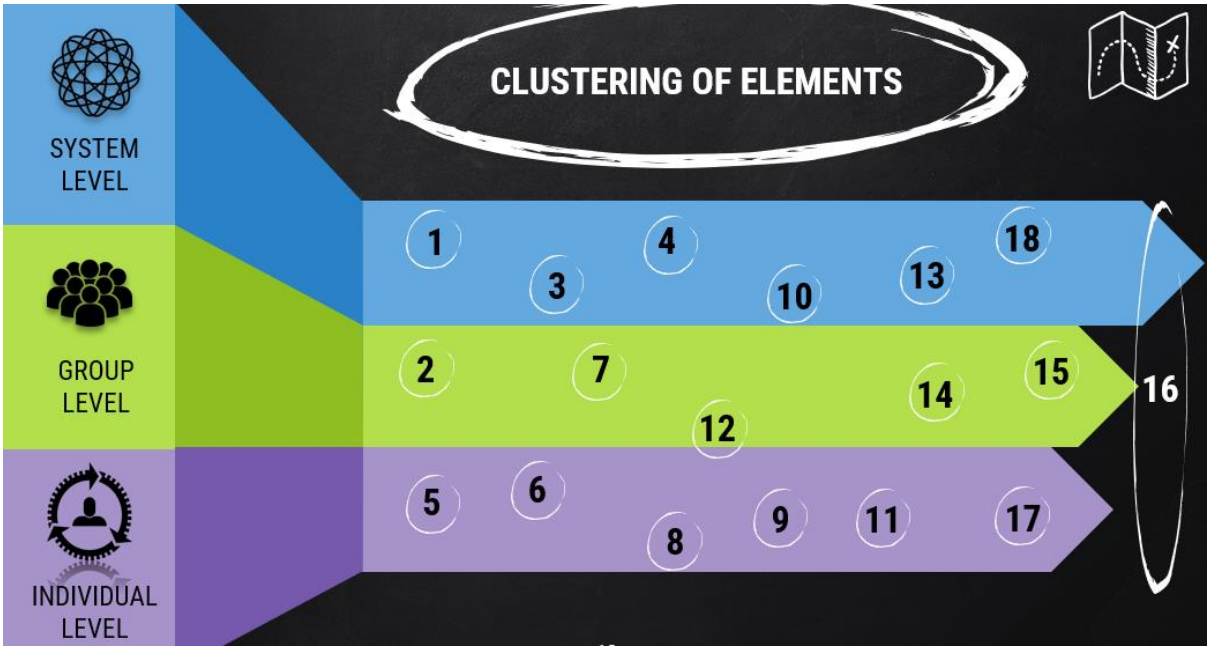

Figure 11. Elements clustering by levels

As can be seen in the **Table *10***, each of the 18 elements was clustered according to the structure to which they belong, with respect to the levels of interaction in which they are found. Each one could then be placed in the Micro or Individual Level (IL), Meso or Group Level (GL), or finally in the Macro or System Level (SL).

A graphical representation is thus made (see **Error! Reference source not found.**) of how each of the elements would be located in one of the clusters, being that some may belong to more than one, so they are located between the line that relates them and the clusters to which they belong, or as happens with element 16 (Theory-U), it does not belong firmly to any but to all the clusters at the same time, so it is seen to be embedded in all of them.

CHAPTER 5: CONCLUSION

Due to the high level of sustainability issues we are facing nowadays, it is expected from the academia to improve strategies for sustainability education and complex project management, and so this work aims to provide some ingredients to enhance this proposed shift.

After studying the bibliography filtered by the systematic literature review, plus the work carried out in the interviews with the different inter and trans disciplinary research centres' representatives, a theoretical solution has emerged for the challenge of including transdisciplinary project management tools that enhance the transition to urban sustainability. The relationship between sustainability education and project management could fall into an anachronism, but this work seeks to develop a continuous narrative between pedagogy and management, which provides the necessary ingredients, tools and methodologies such as soft skills, networking, flexibility, motivational techniques, open mind and open act, sustainability reports, co-creative and collaborative work, soft agile, theory u, stakeholders' engagement, agile methodologies, system and design thinking to cover actual and future needs.

Although the sample size is too small to generate accurate results, the study is of great value because of the selected participants' professional level. Is noteworthy the high level of awareness from the interviewees regarding the subject that concerns us, in their institutions, organizations, or as agents of change. The transformational change is necessary from this high-awareness level, which gives internal confidence and allows to transmit a greater cognitive connection within the consciousness of the system to carry out new models and ways of working. This helps to understand the very complex process of transforming values and beliefs that form our way of viewing and interpreting the world, ourselves, and our behaviours.

Regarding sustainability education and project management, we can conclude that on the side of the former, there is a lack of a clear strategy, as well as a set of

systematic visions and not just isolated cases that do not have the necessary support, as mentioned by the participants, which would be a gap to be solved by integrating the latter. Project management world, has as a weakness the lack of awareness to have a broad vision of their personal role and evolve from "doing things right" to "doing the right things", and it is also necessary to reach the "inner person", working in a more introspective way. It is induced that it is necessary more conscious and sustainable leaders, who consider how the project's results, in which they are involved, impact society and the environment. Thus, there is a positive feedback between concepts that can nurture each other, being interdependent variables: sustainable education is a powerful instrument at the service of a correct management, while project management should contemplate more educational aspects in order to change mentalities to promote habits and actions that generate a systematic cultural change.

As a conclusion, the author reflects on the interrelation between the concepts discussed trying to find some links between them. The notion of "Soft Agile" (see 1.1.4.3 Agile U or Soft Agile), seems a relevant conjunction of the two, and which uses U-Theory to address "leadership capabilities" and "corporate culture", and agile-based methodologies to change "business processes". Thus, soft agile emerges as a solution to the problems posed, proposing a real and sustainable "Business Agility" that allows operating a system under uncertainty and complexity.

From the analysis, the participants complain about shortcomings in the system of their institutions, which limit the achievement of objectives, such as collaboration and co-creation among disciplines, flexibility in schedules and educational curricula, which leads the author to suggest that a systemic change is necessary, which should be enhanced by raising awareness of the use of trans disciplinary project management tools and approaches. Results arise from the recognition of the requirements and tasks, which have become increasingly specific, for which training in various methodologies such as agile, soft skills development, and learning based on real-life problems, so that students can be prepared for the requirements they will have in the future in their professional life. For filling this gap, is possible to take as an example the implementation of own

academies in companies, which train their employees in the business' needs. This contrasts the progress that exist in the private sector, the degree of innovation and the capacity for adaptation and flexibility it has, due to a lower degree of bureaucracy and a more manageable organizational structure, which simplifies the adaptation.

It is clear how the different interviewees refer to their activities as inter and trans disciplinary, but there is no awareness of how they implement multiple project management elements. Recognizing that this is not something esoteric, leads to forming an awareness that allows us to generate really powerful changes, scalable to what is required today. It is certainly a job to be done, involving efforts and support, but being aware of what is happening, and as Scharmer says "making sense and seeing the system itself", allows us to decide how to manage the situation, and be the ones who steer the course to generate the transition. We need to be and train agents of change from the role that each one of us chooses to assume in order to make the true essence of sustainability a reality: to be transcendentally connected and at the service of society.

Appendix

Learning table conformation

At the time of making the **Table *9***, a development was made for the recognition of each of the elements, in which after the analysis made individually to the participants, an initial double-entry table was created, in which each of the participants and each of the 4 sections of the interview were included. Next to each section, columns were included to perform a first extraction of SE and PM elements/features. Then, for each participant, an initial grouping of all recognized elements was made. When they were counted, 31 elements had been recognized.

By analysing each of them, they were regrouped into themes that addressed more elements and not only these as individuals, in order to end up with the final 18 elements that make up the table. After this, each one of them was listed and ordered in the corresponding section (classification by participant), in order to be able to count and recognize the frequency with which each one was repeated, and to analyse their respective relevance.

Participant profiles (sample characterization)

The participants interviewed are part of different self-declared ITD research centres, embedded in universities, public administration, or being independent entities (NGOs or businesses). They are scattered all over the world and are part of the TrUST network (see **Figure 12**).

The importance of the analysis is emphasized once again, due to the selection of the interviewees and their level of professionalism and knowledge of the issues raised. This means that, although we have a small sample, it can be considered as significant for our study and sample of results for the above mentioned.

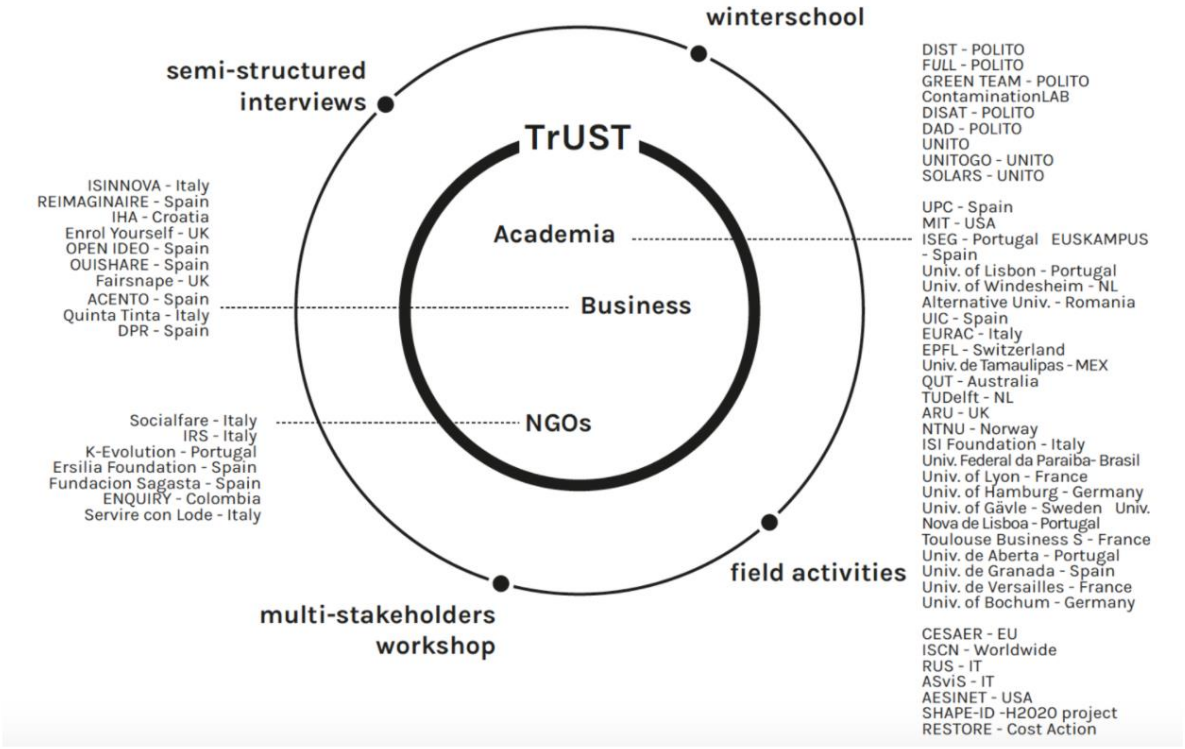

Figure 12. TrUST project networking

The characterization of the sample includes some information about the different participants who belongs to diverse backgrounds in social and natural science, but with experience in SE, and who have participated in the writing workshop, is exposed in the following **Figure 13** and **Figure 14**:

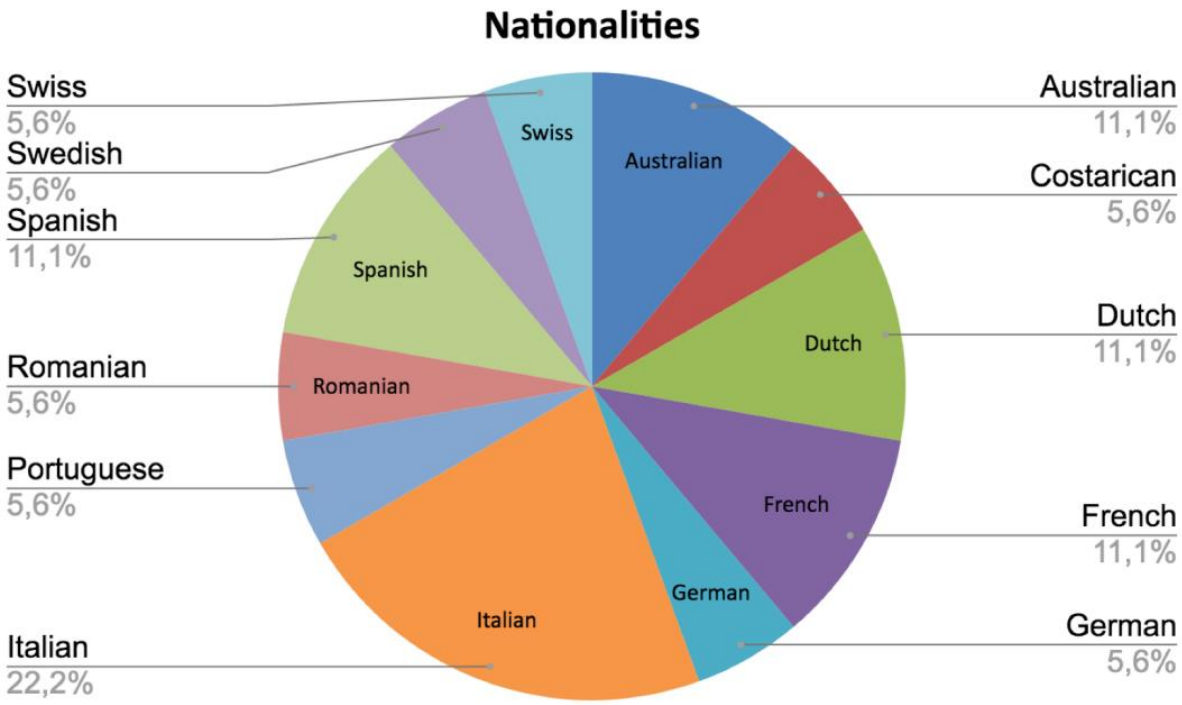

Figure 13. Sample characterization: Nationalities

The **Figure 13** displays that they belong to 11 different nationalities, and the percentages are predominantly from Europe. Nonetheless we have the inclusion of many countries and continents, which leads to a very rich study and more significative results because of the origin of the experiences.

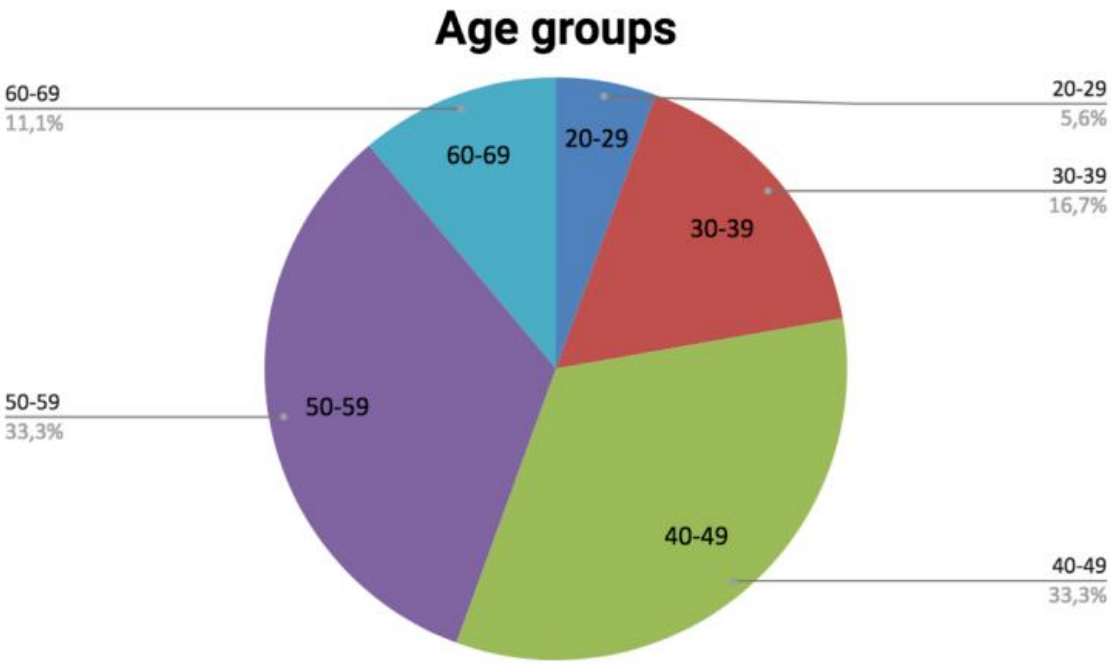

Figure 14. Sample characterization: Age groups

On the other hand, as it is shown on the **Figure 14** the participants were gathered on 6 different age groups. It is possible to see there that they mainly are between 40-49 and 50-59 years old (33% respectively). This is also used as an argument when it comes to understanding the experience and experiences that these people have had, and the point of view they may have on certain issues, is conditioned by the environment in which they have been formed, and the era to which they belong.

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