D6.1 – Pedagogical Model Strategic Plan

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Executive summary

Work package six – "Capacity building Actions on Learning by Developing Pedagogical Model (LbD) in ISR Cities" has two parallel but interconnected objectives: First, in terms of content, it aims to build from WP2's knowledge hubs and paves the way for a common teaching curriculum between InCITIES partners around the topic of Inclusive, Sustainable and Resilient (ISR) cities. Second, given the inherent context-dependent complexity of the topic, it evades the possibility to be taught as a traditional university lecture. Therefore, the Learning by Developing Pedagogical Model (LbD) is introduced as a way for students to learn first-hand how to address the ISR challenges in practice, in collaboration with local and regional stakeholders. The LbD pedagogical approach will be applied in the form of pilot trainings at UNIZA and ISCTE. The first concrete step towards this goal is the delivery of this D6.1 deliverable "Pedagogical Model Strategic Plan", a document that sums up what is going to be done for the pilots, why and how.

In the deliverable, Chapter 1 introduces the policy background and the European goals underpinning the inCITIES project, such as the Climate-Neutral and Smart Cities Mission. Chapter 2 makes the connection between the Sustainable Development Goals (as the foundation for the ISR teaching content) and the Inner Development Goals (as the foundation for the LbD approach). IDGs are particularly important to empower students to feel capable of acting and making impact despite the scale of climate change and social challenges cities are facing today. A summary of the state of progress towards the SDGs is also provided for each participating country (Slovakia, Portugal, France, Germany and Finland). Chapter 3 unpacks in more detail the theory and application of the LbD approach. It also presents the model of six pillars of futures thinking for transforming (Inayatullah, 2008) which is used when intervening in cities. Chapter 4 introduces the framework for the design and guidance of the pilot courses, which are currently due to start in the Spring semester 2024 (February-May) at UNIZA. Finally, chapter 5 introduces the online training courses that will be developed to build the foundation for the LbD approach and learnings to continue being adopted by InCITIES partners beyond the life of the project.

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1. Introduction

As stated in the Berlin Declaration on Education for Sustainable Development (2021), urgent action is needed to address the dramatic interrelated challenges the world is facing, referring to the climate change, biodiversity loss, pollution, pandemic diseases, extreme poverty and inequalities, violent conflicts, and other environmental, social and economic crises that endanger life on our planet. This calls for the integration of all the dimensions of sustainable development (i.e., economic, social, and ecological). As a starting point, the declaration draws attention to ensuring that the development trajectories are not exclusively oriented toward economic growth, i.e., to the detriment of the planet, but towards the well-being of our entire planet and population. Importantly, **the declaration sees education as an effective tool to respond to the challenges**. Especially in terms of creating the positive shift in mindsets and world views seen as a prerequisite for the needed change agency.

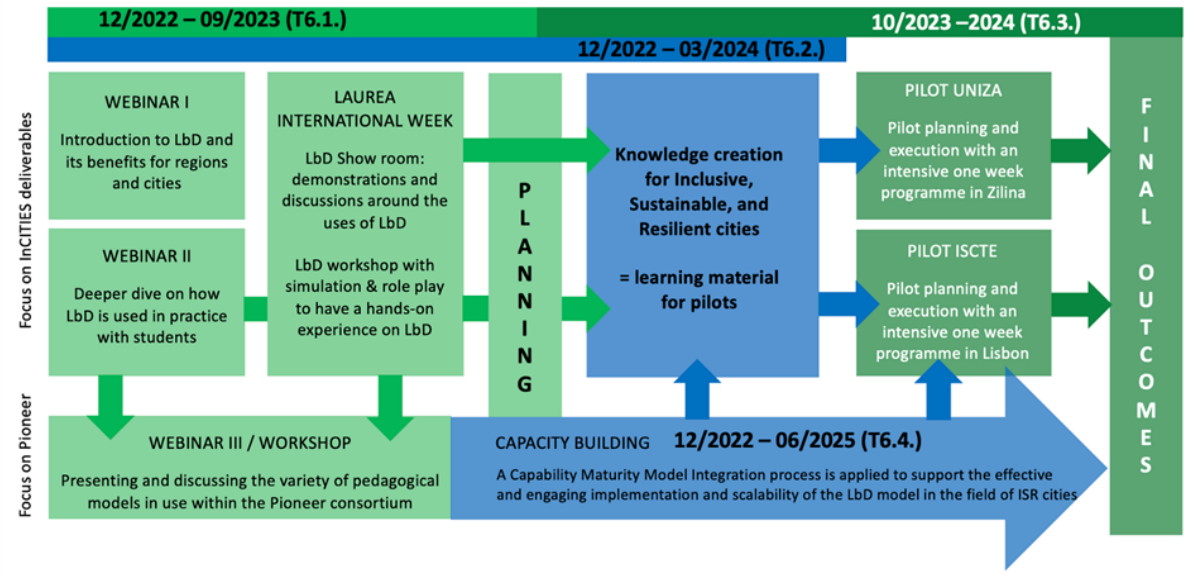
These challenges tend to accumulate in urban areas – making the UN Agenda 2030 Sustainable Development Goals (SDGs) more visible and tangible than ever. Effectively, since the launch of the European Green Deal in 2019, many actions have been taken to answer the unfolding climate change. For example, ambitious commitments have been made for **Europe to become the first climate-neutral continent by 2050 and to reach the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030** ("fit for 55") in comparison to 1990 levels. Or, in terms of research and innovation, the former focus on specific disciplines of intervention and technological themes has been replaced with more holistic, cross-sectoral and interdisciplinary approaches to urban challenges. In Horizon Europe this silos-bridging approach is confirmed in many ways, including the "Climate-Neutral and Smart Cities" mission.

The ways how the SDGs inform and guide their integration into national planning frameworks, in the form of national development plans or sustainable development strategies are of crucial importance in ensuring that the purpose of the new Agenda 2030 is realised. Given that even in the professional sphere the action toward sustainable development and social responsibility is too often reduced to environmentally friendly gestures and the raising of the population's awareness of the situation, in many instances, only specific professions get their hands on this work. In order for this situation to change, **universities have an important role not only in enhancing the discussion but also on the application of the Agenda 2030 principles**. This not only concerns but is an opportunity for the European higher education institutions to involve in their activities – including teaching, learning, content development, social actions, career guidance, workforce integration, facilities and property management, finance, human resources, IT and food "services" – the debate on the SDGs.

Hence, the aim of this report – InCITIES Deliverable D6.1 - is to create a good general introduction on the strategic plan and focus of **WP6 – Capacity building actions on Learning by Developing pedagogical model in ISR cities**. In doing so, in the second chapter – Responding to future challenges in ISR cities – the key drivers for WP6 execution are presented. In the third chapter – Learning the LbD pedagogical model – the LbD model as well

as the six pillars of futures thinking for transforming are introduced. In the fourth chapter – Pilots co-design and study cases – the motivations and preliminary plans for the pilots are discussed. Lastly, in the fifth chapter – Capacity building – attention is given to the final outcomes of this WP, a Capability Maturity Model and a training course, both of which the impact expands beyond the project's lifetime.

Table 1 - The InCITIES WP6 aims and objectives.



2. Responding to future challenges in ISR CITIES

2.1 The Sustainable and Inner Development Goals (SDGs and IDGs)

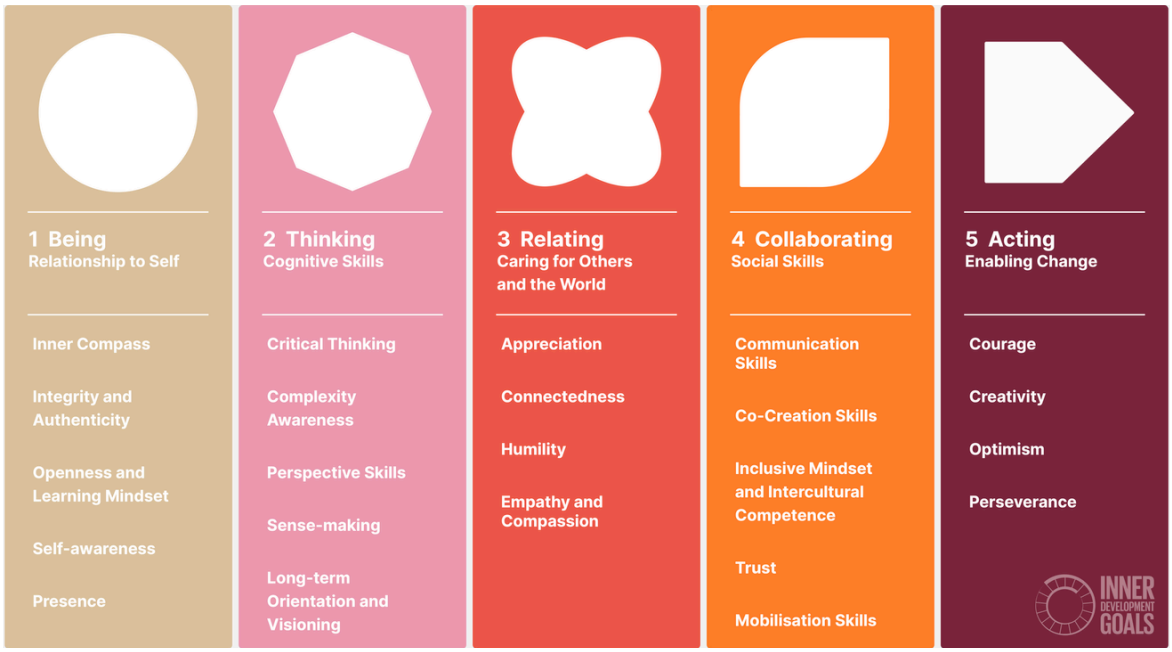
The risk of reaching multiple tipping points in the Earth's physical systems is more and more concrete each year. As the recent Sustainable Development Report (2023) confirms, we are severely lagging behind in achieving progress with the SDGs: "Since the outbreak of the pandemic in 2020 and other simultaneous challenges, SDG progress has stalled globally. In most high-income countries (HICs), automatic stabilisers, emergency expenditure, and recovery plans mitigated the impacts of these multiple crises on socio-economic outcomes"[1]. **Only limited progress is being made on the environmental and biodiversity goals**, including SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land), even in countries that are largely to blame for the climate and biodiversity crises".

[1] https://dashboards.sdgindex.org/chapters/executive-summary

The report also indicates how in an information-rich and post-truth environment[2], both citizens and decision-makers need new knowledge and tools to transform data and science into evidence, actions, and long-term policies. In a world where only, few teenagers can differentiate between a fact and an opinion, there is also a **huge lack of personal capacities to deal with these increasingly complex challenges**. This means that, while there is an obvious urgency for more humans to globally discuss the SDGs, more focus should be directed toward their inner capabilities to assist in the needed transformation.

One approach to this challenge is the rapidly expanding global initiative of Inner Development Goals (IDGs), launched in 2015[3]. With currently over 100 nationalities involved, representing a great variety of expertise areas and professions, organised in theme or country specific hubs and cross-cutting teams, the aim is to research, collect, co-create, and communicate such science-based skills, qualities and values that help to progress with the SDGs in all communities and societies throughout the globe. All in all, the IDGs are very much about our need to develop and evolve as humans first to then better be able to take informed decisions and actions regarding the SDGs. The IDG framework consists of 5 dimensions and altogether 23 transformational skills as demonstrated in table 2.

Table 2 - The IDG framework[4] (2021).



[2] https://www.oecd.org/digital/bridging-divides-in-a-post-truth-world.htm; https://www.jstor.org/stable/26500664

[3] https://www.innerdevelopmentgoals.org/

[4] https://www.innerdevelopmentgoals.org/framework

2.2 The current state-of-affair in European cities

Slovakia

Slovakia took part in the voluntary national review of 2030 Agenda in 2018, where six national priorities connected to the SDGs were set:

1) Education (SDGs 4, 8, and 10): "education is a life-long process, which should enable a life in dignity under rapidly changing circumstances and requirements";
2) Transformation towards an environmentally sustainable and knowledge-based economy in the context of demographic change (SDGs 7, 8, 9, 10 and 12);
3) Sustainability of settlements, regions and the countryside in the context of climate change (SDGs 6, 7, 11, 13 and 15), with special emphasis on diminishing regional disparities;
4) Social inclusion (SGDs 1, 2 and 10), recognising that Slovakia is performing well on eradicating poverty but work remains to be done with the most vulnerable groups of society;
5) Rule of law, democracy and security (SDGs 5 and 16), emphasising the role of strong institutions and data-based governance; and
6) Good health (SDGs 3 and 10) and tackling health disparities.

At the time, a more detailed assessment for each SDG was completed by the Statistic Office of the Slovak Republic, laying a baseline of indicators to provide a view on the current (2018) situation[5]. In the same year, the Ministry of the Environment of the Slovak Republic published its Adaptation Strategy for Climate Change[6] towards 2025 (with a view to 2030), followed by an Action Plan in 2021[7]. A full report on progress towards each SDG was published in May 2023[8].

Based on this, cities, municipalities and some districts have updated their own adaptation strategies and action plans for climate change[9]. This is also the case for Zilina[10], which produced its own strategy in parallel with a 2-year process of citizen consultation in 2022 and 2023. From this, many projects were started, including for example, information and engagement of school children about the climate, the planting of trees and flowers alongside roads and in industrial areas, renovation and protection of public parks and forests in and

[5] https://slovak.statistics.sk/wps/wcm/connect/605fd33f-91b4-400f-a7c5-a18d3340c9cd/The_Slovak_Republic_and_the_Sustainable_Development_Goals_of_the_2030_AGENDA.pdf?MOD=AJPERES&CVID=mfev2OG&CVID=mfev2OG

[6] https://www.minzp.sk/files/odbor-politiky-zmeny-klimy/strategia-adaptacie-sr-zmenu-klimy-aktualizacia.pdf

[7] https://www.minzp.sk/files/odbor-politiky-zmeny-klimy/akcny-plan-implementaciu-nas.pdf

[8] https://slovak.statistics.sk/wps/wcm/connect/605fd33f-91b4-400f-a7c5-a18d3340c9cd/The_Slovak_Republic_and_the_Sustainable_Development_Goals_of_the_2030_AGENDA.pdf?MOD=AJPERES&CVID=mfev2OG&CVID=mfev2OG

[9] https://www.sazp.sk/zivotne-prostredie/starostlivost-o-krajinu/zelena-infrastruktura/adaptacne-strategie-a-akcne-plany-na-zmenu-klimy.html

[10] https://www.zilinaklima.sk/adaptacna-strategia-a-opatrenia/

around the city, improving the energy efficiency of public buildings (particularly schools and kindergartens), the purchase of an electric car fleet for city services (such as meal deliveries to the elderly), experimenting with green roofs on selected buildings, and finally starting a bio-waste management system.

Portugal

In 2023, Portugal took part in the voluntary national review of the Agenda 2030[11], and to reinforce the commitment with the 17 Sustainable Development Goals (SDG), the Portuguese Government adopted a new inter-institutional mechanism: the coordination and monitoring of the implementation of the UN 2030 Agenda is the responsibility of the Presidency of the Council of Ministers, internally, and the Ministry of Foreign Affairs, externally and in terms of cooperation policy. Its action is also assisted by the other areas of government in the sectoral implementation of the Sustainable Development Goals. A High-Level Monitoring Committee was also created, including representatives from these two Government areas, Regional Governments, Local Authorities, the Economic and Social Council, and prominent members of civil society.

This new institutional framework for the governance of the Agenda 2030 is committed, as a first priority stage, to defining a National Roadmap, that will have to take into account the different dimensions of the process of implementing the SDGs in Portugal, through an analysis of the current state, and defining actions for a phased development up to 2030. The objectives of this National Roadmap are: 1) to define and map the links between national strategic instruments and the SDGs, as well as commitments made at European level, ensuring the overall coherence of public policies; 2) improve the monitoring and evaluation of Portugal's progress towards the SDGs, taking into account upstream methodological assumptions and respecting the multi-level nature of implementation; and 3) to increase the levels of public awareness and knowledge of the 2030 Agenda.

In this national strategy towards achieving SDG, cities and municipalities are fundamental. One hundred European cities have signed the Green City Agreement, promoted by the European Union, and 27 of them are Portuguese. The Green City Agreement is a voluntary movement by European cities, and specifically their mayors, to transform cities into more attractive places to live by 2030. The Green City Agreement unite Portuguese and European municipalities around a common vision of an urban life in which, by 2030:

- Cities will be attractive places to live and will promote the health and well-being of citizens;
- Significant improvements in air quality in cities will be made, respecting the World Health Organization guidelines;
- The quality of water bodies and the efficiency of water use will be improved;

[11] https://hlpf.un.org/countries/portugal/voluntary-national-review-2023

- Efforts will be made to preserve urban biodiversity, by increasing the size and quality of green areas in the city, and preventing the loss of urban ecosystems and restoring them;
- The circular economy will be a reality and waste will be transformed into resources by encouraging reuse, repair and recycling;
- Reduction in noise pollution will be significant, approaching the levels recommended by international organisations.

The progress and current situation on the SDGs in Portugal are monitored by INE (Statistics Portugal), the national statistics institute, through 170 indicators (coverage rate of 69 percent), having increased by 17 percent since 2018, with 74 percent of the targets having at least one associated indicator - SDG 9 stands out with 100 percent of the targets having at least one associated indicator, and SDG 12 at the opposite extreme with 46 percent. Of the indicators monitored, compared to 2015, 59.4 percent are on a positive trajectory[12]. There is a lacking of city and municipal indicators that should monitor the SDG agenda, the statistics mainly exist at the national and regional levels.

As described by the 2023 Voluntary National Review, several efforts have been made to locally implement the SDGs and there are several examples of good practices at the city and municipal levels:

- The "Rede Portuguesa de Municípios Saudáveis" (Por-tuguese Network of Healthy Municipalities), is an association of 65 municipalities whose mission is to support the dissemination, implementation and development of the Healthy Cities projects in munici-palities that intend to make health promotion a priority on the agenda of policy makers.
- The Portuguese network affiliated to the International As-sociation of Educating Cities ("Asociación Internacional de Ciudades Educadoras") (AICE), a non-profit association. It comprises a permanent structure of collaboration between local authorities committed to the Charter of Educational Cities. The Portuguese network has 90 members and is a member of several of the thematic working groups. The «Inclusive Cities» Working Group, includes 36 Portuguese municipalities and is regularly acti-ve in terms of participation in national congresses, holding thematic meetings and the dissemi-nation of municipalities' activity around the axes of «inclu-sion» and «educational cities».
- Portuguese Network of Smart Cities (RPCI), this network of 120 municipalities was established as the Pilot Network for Electrical Mobility. RPCI is managed by INTELI (a private non-profit association). This dedicated digital transition ne-twork impacts on SDG 11. RPCI assigns a seal that distinguishes projects associated with the «Smart City» concept, promoting innovation, creativity, sustainability, inclusion, participa-tion and quality of life, in a context of «reinvention of cities».

[12] https://hlpf.un.org/sites/default/files/vnrs/2023/SDG_20152022a.pdf

- INTELI has established the Smart Cities Index 2020, that aims to measure the attrac-tiveness of cities to talent, visitors and investors by linking innovation, environmental quality and social and cultural inclusion.
- The «Smart Cities» Section of Municipalities, with more than a hundred Municipalities, dedicates its attention to matters such as work and econo-mic growth (SDG 8), innovation and infrastructure (SDG 9), creation of sustainable communities (SDG 11), and partnerships for the implementation of the SDGs (SDG 17);
- The Municipalities Section for Climate Action, with more than 70 Municipalities, which dedicates its ef-forts on sustainable cities and communities (SDG 11), climate action (SDG 13) and protecting life on earth (SDG 15).

France

French law and French ministries provide national laws and requirements as well as objectives declined through agendas (as in figure 1).

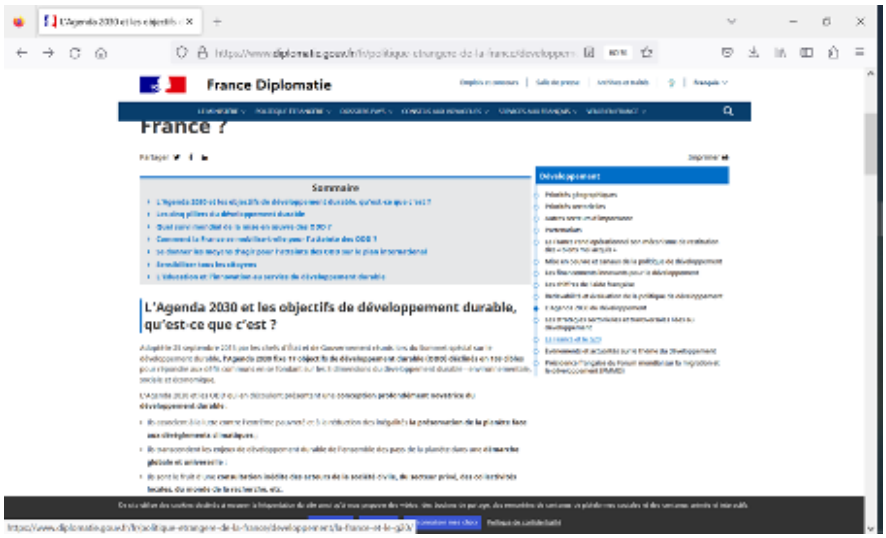


Figure 1 - Presentation of 2030 Agenda on the French Governmental website.

The territorial collectivities that include cities/municipalities of various sizes, apply the law and deliver reports each year in application of the law; they also show how the budget is executed for the benefit of the citizens in the framework of transitions.

French activities on SGDs[13]

"From 2019, France adopted a roadmap aiming to define the priority issues and the trajectory to follow for implementation of the SDGs and the 2030 Agenda. It is a call to all stakeholders

[13] Source [1] : https://www.diplomatie.gouv.fr/fr/politique-etrangere-de-la-france/developpement/l-agenda-2030-du-developpement/article/l-agenda-2030-et-les-objectifs-de-developpement-durable-odd, the 13th September 2023 extract from ministry website.

(parliamentarians, NGOs, higher education, State, communities, businesses, unions, etc.) to invest in the implementation of the 2030 Agenda for build renewed governance.

France's priorities for the implementation of the 2030 Agenda are the following:

- Area of action 1: Work for a fair transition by eliminating all forms of discrimination and inequality and guaranteeing the same rights, opportunities and freedoms for all
- Area of action 2: Effect transformative societal change with low-carbon, resource-efficient economies working in support of the climate, the planet and biodiversity
- Area of action 3: Leverage education and lifelong learning to gear behaviour and lifestyles to our future world and sustainable development challenges
- Area of action 4: Improve health and well-being for all through healthy and sustainable food and agriculture
- Area of action 5: Ensure effective citizen participation in efforts to achieve the SDGs, and accomplish transformative societal changes by scaling up local experimentation and innovation
- Area of action 6: Work at European and international level for the sustainable transformation of societies, peace and solidarity

The 2030 Agenda cannot be delivered without citizen engagement: ensuring their participation in public policies helps to improve public decision-making and essential if the decisions that result are to be sustainable. It is therefore vital to achieve effective public participation in all spheres, starting from the design phase of public policies, throughout their implementation and right up to their evaluation. Special attention needs to be paid to the most vulnerable, so as to ensure that no-one is left behind. Institutions, if sincerely motivated in these approaches, will be able, through their attitudes, attentiveness, transparency and accountability, not only to build trust among all stakeholders, but also to establish a momentum of engagement and empowerment that is all the more likely to bring about lifestyle transformations.

The Government, administrations, parliamentarians and local authorities are increasingly turning to approaches based on community participation. There are texts and procedures that underpin such approaches, as well as consultation mechanisms enabling the information, consultation, dialogue and co-construction with the public. While the first consultations took place at the local level, consultations at the national level have been multiplying in recent years as well."

Performing SDGs issues and transitions at the metropolitan level

French territorial collectivities are providing annual reports based on their activities according to French laws, namely LOI n° 2021-1031 du 4 août 2021[14]

[14] Source [2]: CGCT (Code général des collectivités territoriales) : CHAPITRE Ier : Budgets et (…)

- The Nantes metropolitan area (24 cities/municipalities)[15] shows its report launched in December 2022, Nantes Métropole's comprehensive sustainable development report lists both actions taken and results, in the form of quantified indicators. 21 indicators and 6 objectives to contribute to SDG achievement are detailed from questions such as: How much have our greenhouse gas emissions fallen? How are natural spaces resisting artificialization? How is organic farming developing in the region?

Prior to debates on the draft budget, the President of the Lyon Metropolitan Council presents a report on the sustainable development situation with regard to the operations of the Lyon Metropolitan Council, the policies it pursues on its territory and the orientations and programs likely to improve this situation and contribute to achieving the sustainable development goals set out in the 2030 Agenda for Sustainable Development, adopted on September 25, 2015 by the United Nations General Assembly (in reference to article L 3661-2 du CGCT). In this report[16] the dashboard defines achievement indicators for each of the eight transitions, actions and systems deployed by the Metropolis, and result indicators, which refer to the strategic objectives.

More, in this territorial collectivities' reports, examples of local transitions implying citizens are given at each city level. Below we have selected examples from our sources [1 to 4] (see this section footnotes).

Synthesis and examples extracted from the sources [1, 3, 4] (see this section footnotes) are shown:

Titre Ier : DISPOSITIONS RELATIVES AUX OBJECTIFS DE LA POLITIQUE DE DÉVELOPPEMENT SOLIDAIRE ET DE LUTTE CONTRE LES INÉGALITÉS MONDIALES ET À LA PROGRAMMATION FINANCIÈRE (Articles 1 à 4)

LOI n° 2021-1031 du 4 août 2021 de programmation relative au développement solidaire et à la lutte contre les inégalités mondiales - Article 4

I. - Associations, companies, in particular those in the social and solidarity economy, diasporas, social partners and citizens, including representatives of the most vulnerable, play an essential role in the policy of solidarity-based development and the fight against global inequalities. In particular, they contribute to information, training and citizen appropriation of the issues at stake in sustainable, solidarity-based development, notably through citizenship and international solidarity education activities. With this in mind, the French government recognizes volunteering as a transversal lever of action in the policy of solidarity-based development, and promotes access for all to international volunteering schemes and "reciprocal" volunteering.

II. - The State shall involve French and partner country civil society organizations, the beneficiaries of solidarity development actions and citizen movements engaged in solidarity development actions in its policy of solidarity development and the fight against global inequalities, and shall establish conditions enabling their participation in the preparation and implementation of the development programs and projects it finances. The State organizes an annual dialogue with civil society players covering all the components associated with the policy of solidarity-based development and the fight against global inequalities.

[15] Source [3]: https://metropole.nantes.fr/actualites/2022/institutions/conseil-metropolitain-16-12-22/infographie-rapportdd-nm-2022, the 13th September 2023

[16] Source [4] Metropole du Grand Lyon RAPORT TRANSITION & RÉSILIENCE sur la situation en matière de développement durable, établi en application de l'article L 3661-2 du CGCT, 80 pages, 2022.

- The city of Strasbourg has embarked on a budget alignment process regarding the SDGs, encompassing not only the council budget of the city itself, but also the budget of the Eurométropole of Strasbourg, the wider area encompassing 33 municipalities. In 2019, a line-by-line analysis of the budgets for investment, general operations and associated appended budgets confirmed the pertinence of the UN framework for more integrated management of sustainability policies for these two different levels of local government.
- The short supply-chain local food projects (LFPs) are an excellent illustration of the emergence of collective, systemic projects designed to bring together all value chain stakeholders in a given geographical area. In this particular example, the focus is on meal provision, and the projects bring together producers and consumers, as well as those performing food processing, distribution and institutional catering. As of 1 April 2022, more than 370 LFPs had been registered, with at least one LFP in every 'département'.
- In 2020, the Citizens' Climate Convention submitted 149 proposals aimed at lowering GHG emissions by at least 40% by 2030. This first ever experimental citizens' climate assembly, with its outcomes and practical implications, especially of a legislative nature, with the Act passed on 22 August 2021 on combatting climate change and building resilience against its effects, has become a point of reference, even internationally, for rethinking citizens' involvement in public debate.
- An exemplary initiative on the road to SDG 7
  The Castelnau-le-Lez City Council has created a photovoltaic power station with the social housing office of the Montpellier Metropolis. This power station comprises 2,500m^2 in solar canopies and produces 500 kWp, or 660 MWh/year, making it possible, through the public electricity grid, to cheaply power the city's schools and administrative buildings, which represents a third of the Council's contracted electricity for 30 years.
  The electricity for schools contributes to SDG 11.1. The social housing office can use the power for its own requirements, thus contributing to SDG 7.1. The longevity of the facilities and the lengthy contract phase – 30 years – aims for SDG 9. The funding draws on broad civic participation (SDG 17): participatory investment that was open to anyone able to invest between 10 and 500 Euros. The municipal budget has not had to bear the slightest cost. In parallel, energy saving measures were implemented for public buildings (SDG 7.3) as well as measures for attenuating summer heat (such as canopies, greenery and night-time airing) at the service of SDG 13.1.
- The city of Bouguenais (Nantes campus) has received the label climate air energy as according to the program «TERRITOIRE ENGAGE TRANSITION ECOLOGIQUE "funded by the national agency for energy| ADEME"[17].

[17] https://www.youtube.com/watch?v=gAc_B6j1qcY

Germany

In Germany, the leading municipal associations as well as the German Institute of Urban Affairs and the Bertelsmann Foundation released a report on May 2023 titled "The state of implementation of the 2030 Agenda in German municipalities"[18]. This report draws up an interim mid-term review on the implementation of the 2030 Agenda. As its main conclusion it states that the municipalities have made considerable progress in recent years in achieving individual Sustainable Development Goals (SDGs). The relevance of sustainable development in administrative action is perceived - cities, counties and municipalities in Germany attach great importance to the topic.

But even though a "sustainability dynamic" has been sparked in various areas of society, it must also be noted that this increased commitment is not enough. The efforts of the local authorities in conjunction with the federal and state governments must be massively increased in the coming months and years.

Roughly two-thirds of the municipalities surveyed for this mid-term review stated that the topic of "Sustainable development" is "very important" or "rather important" to them. This means that there has been no change in the high and political relevance of the topic for the municipalities. For a similar survey in 2016, the cities, districts and municipalities had already attributed a comparably high importance to the topic.

The importance of the individual SDGs for the municipalities varies considerably in some cases. The survey results show that SDG 4 "Quality education," SDG 7 "Affordable and clean energy," and SDG 13 "Climate action" are highly relevant and most measures are implemented in these areas.

As a result, it can be stated that the first effects of the sustainability efforts in the municipalities are discernible. The SDGs with the most positive development between 2015 and 2021 (or 2020, depending on the indicators and data) are SDG 1 "No poverty", SDG 7 "Affordable and clean energy", SDG 8 "Decent Work and Economic Growth," SDG 9 "Industry, Innovation, and Infrastructure," and SDG 16 "Peace, justice and strong institutions." Accordingly, the transformation areas 1 "Human well-being and capabilities, social justice", 2 "Energy transition and climate protection", and 6 "Pollutant-free environment" show the most positive - albeit mixed - development trends.

Recommendations for action

German municipalities have long been committed to the international Sustainable Development Goals. The aim is to keep cities, districts and communities liveable for future generations. Climate change, the effects of the COVID-19 pandemic, the energy and climate crisis, and global refugee movements demonstrate the urgent need to further develop our sustainability strategies and climate concepts.

[18]https://www.staedtetag.de/publikationen/weitere-publikationen/2023/handlungsempfehlungen-und-halbzeitbilanz-agenda-2030-in-deutschen-kommunen

Local authorities have a fundamental responsibility to implement the 17 Sustainable Development Goals. Considering the 169 sub-goals, around 65 percent of the sustainability goals can only be achieved with the involvement of local actors. At the same time, local authorities are aware that local action and commitment to sustainable development do not stop at their borders. Thus, more than 200 German municipalities have now adopted the model resolution "2030 Agenda for Sustainable Development: Shaping Sustainability at the Local Level" of the Council of European Municipalities and Regions of Europe.

Municipalities are committed to sustainable development in a variety of ways. This commitment ranges from education, health care with hospitals and emergency services, affordable housing and social affordable housing, social security, childcare and gender equality, intergenerational finances to climate protection and climate impact adaptation, green and open space planning and preservation of biodiversity, nature conservation and environmental protection, sustainable energy and heat supply and mobility, and sustainable construction and the circular economy.

The awareness of a global responsibility has grown considerably in municipalities in recent years. Nevertheless, it is not certain whether the many advances made will be sufficient to comprehensively achieve the goals by 2030. Overarching sustainability strategies, systematic impact measurement and anchoring in budgets will make an important contribution in the coming years.

In many cases, efforts to achieve sustainability alone will not be enough. In addition, there must be a greater awareness of limited natural resources, climate change and the threat of species loss, as well as the corresponding interactions. The federal, state and local governments must set framework conditions, incentives and impulses for resource-conserving life and the preservation of quality of life.

The framework conditions are an enormous challenge for all levels. Land use and resource consumption as well as the resulting emissions are a burden on the environment. High debts jeopardize the ability to achieve social balance and invest in the future. Thus, the circular economy must be given top priority in (regional and municipal) economic policy.

Another focus must be on promoting sustainable construction, on modernization of existing buildings, as well as on the redensification in inner areas instead of land consumption in the outer area. At the same time, the preservation of green and open spaces in densely populated areas must be given even greater priority.

Likewise, issues of global justice are becoming increasingly pressing. Despite positive developments commitment must be further expanded at all levels and in all parts of the country equally to actually ensure that no one is left behind.

In view of these major challenges and the short time remaining, there is a high level of urgency to advance the implementation of the SDGs at the municipal level. In this context, municipalities should already be involved in shaping the post-Agenda 2030.

Practice examples

Some examples are provided hereafter:

- City of Hannover: The goal of sustainable traffic and mobility development in the city is to create, through intelligent and mobility management environmentally friendly mobility infrastructures and offers for the city centre, the city districts and the individual neighbourhoods in equal measure. To this end, Hannover developed the "Mobility 2025 Master Plan".
- City of Düsseldorf: The state capital of Düsseldorf adds the indicator 10.7 "Care and integration of refugees and homeless people". The indicator measures the implementation of the citywide integration concept.
- City of Bonn: Climate protection is an integral part of urban land use planning in Bonn. Starting in 2021, the city has been the first and one of the few cities in Germany to mandate the installation of photovoltaic systems in new construction projects over which it has direct influence under planning law.
- City of Stuttgart: On the way to a circular economy, the state capital of Stuttgart has introduced "organic food days," among other things. This project aims to provide school children with a varied, nutritionally optimal menu with high-quality food stuffs and at the same time to contribute to environmental protection.

Finland

In Finland, as part of the Ministry of the Environment's Sustainable City programme[19], 12 experiments[20] on sustainable urban development have been carried out between 2022 and 2023. The Sustainable City programme has been going on since 2019, and the work will continue until the end of 2023. The experiments are listed in table 3.

These experiments have focused on inclusion, interaction and solutions that cut across dimensions of sustainability for sustainable urban development and intensify cooperation between the state and cities in sustainable urban development. So far, around 90 cities and municipalities and around 70 other organisations have participated in the programme. The measures have improved the preconditions for emission reductions and social sustainability in communities, supported the diversity and well-being impacts of local nature, and strengthened sustainability management and new ways of participation.

As an example, one of the experiments was conducted in the City of Tampere, where a carbon footprint calculator was used to develop ecologically and socially more sustainable mobility (services). This was done in cooperation between the City of Tampere, the University of Helsinki and VATT Institute for Economic Research. The idea was also to study whether targeted health communication could motivate people to choose more sustainable modes of mobility, such as walking or cycling, and how favouring sustainable modes of transport in zoning and design solutions could increase sustainable mobility.

[19] https://kestavakaupunki.fi/en/solutions
[20] https://ym.fi/en/-/experiments-provided-cities-with-tools-for-more-interactive-sustainability-work

Another example is the Sustainable Inclusion project which developed tools and models for planning and implementing inclusion in Lahti. The Skididialogi and Miniskididialogi methods empowered children and young people to have their voices included in sustainability themes and other topical issues. In addition, the project created an interactive model for sustainability work to be used in regional partnerships and introduced the Kerro Pois! - concept that generated dialogue between the inhabitants of the region, partnerships and the city organisation. The Sustainable City programme results included, among others, a local sustainable development agreement model, a digital portal for resource wisdom work that supports cooperation within the city, and new ways of involving residents in urban planning and municipal sustainability measures.

Table 3 - Experiments of participatory and interactive sustainability work.

A list of experiments carried out in Finland in 2022-2023
• City of Espoo. The Future Workshop for Sustainable Development (TUPA). • City of Hämeenlinna. Urban living room in Hämeensaari. • City of Jyväskylä. REDI(4)2030 = Digital portal for resource wisdom work of the City of Jyväskylä – strengthening information-based management and communication on a shared journey towards a carbon-neutral city in 2030. • City of Järvenpää. Eco-socially sustainable event production model. • City of Kouvola. Making the sustainable development operating model part of the residents' everyday life with the help of regional committees. • City of Kuhmo. Full life in Kuhmo – Sustainable development through everyday actions. • City of Lahti. Sustainable inclusion in Lahti. • City of Lappeenranta. Awfully wonderful! – Making sustainable actions visible by means of environmental art. • City of Nurmes, Espoo and Siuntio. Urban planning and culture divisions building a (joint) model of smart and socially sustainable resident inclusion. • City of Tampere. KELI – Promoting more sustainable mobility with the help of a carbon footprint calculator. • City of Vaasa. Vaasa with energetic residents – Invånarenergisk Vasa. • City of Vantaa. Skills and participation – Engaging children and young people in building a more sustainable food culture.

2.3 The 7 Inclusive Sustainable and Resilience themes

Originally, the following six main challenges of future cities were identified in 2021 by the founding members of the PIONEER alliance, i.e., the InCITIES partners:

- Carbon-neutral urban areas
- Safety, security and risk management for resilient cities
- Technology enhanced solutions with and for smart and citizen-centred cities
- Service design with and for socially, culturally, ecologically, and economically sustainable future cities
- Sustainable urban life and tourism

- Circular economy with and for urban citizens

All in line with the United Nations' Agenda 2030 and the strategic axes of the European Union policies that were launched in parallel with the Alliance development (Green Deal in 2019, EU mobility strategy in 2020, Climate law in 2021). They also follow the Regional Research and Innovation Strategies for Smart Specialisation (RIS3) in connection with the partnering Higher Education Institutions partners of the InCITIES project (5 countries).

The reasoning behind these themes is to encompass actions to reduce emissions, to create jobs and growth, to address energy poverty, to reduce external energy dependency, and to improve citizens health and well-being. In doing so, **the InCITIES project will provide a systemic and integrated approach to the SDGs, best captured by the SDG11: "making cities inclusive, safe, resilient and sustainable"**. What this means in practice, is that the system of InCITIES activities, bridging research, training, and innovation, contributes to 13 SDGs and involves not only teachers, researchers, students, but also all the partners of the universities' ecosystems on the territories (communities, companies, citizens, NGOs). The identification of these topics is thus increasing the potential to bring complementary and interdisciplinary knowledge and competencies for a sustained collaboration embedded in the European policy needs and research programs within the InCITIES partnerships.

Respectively, in the InCITIES WP2, a step-by-step approach was applied, including a survey of "hot" research topics and a co-construction process using email exchange, questionnaires, and consolidation workshops. These identified key challenges, presented in table 4, thus form the key issues to also address in the pilots carried out in WP6 (see chapter 4). The focus of the thus resulting activities is on inclusiveness, sustainability and resilience (ISR) issues, i.e., the ISR themes (see also chapter 4 and 5).

Table 4 - The key challenges to address in InCITIES, categorised in themes and sub-themes.

	ISR Theme	Sub-themes
1	**Questioning urban transition**	Welfare futures, democracy enhancement, justice and inclusion by spatial design, circular economy, citizen's behaviour, needs and expectations, enablers of change
2	**Nature in the city**	Sustainable production from nature, adaptation (mitigation) connected to climate changes risks, cross cutting: governance, citizen engagements
3	**Energy in the city**	Energy management, decentralised production, sustainability assessment of energy systems; energy communities, energy modelling and prediction
4	**Vulnerability, inclusion, and health in the city**	Multidimensional inequalities and vulnerabilities, pollution and health impacts, accessibility and disability situations, vulnerable groups and healthcare solutions, well-being economy, vulnerability, and crisis management
5	**Mobility**	Travellers' needs toward inclusive mobility, first and last mile urban logistics, cycling systems design, transport operations modelling, intelligent transport systems and transformation of mobility, monitoring travel behaviour, interventions in public spaces
6	**Digital transition**	Cybersecurity and security, sensors in smart cities, business models for smart cities, metrics, and analytics, urban planning and management, digital twins,

		inclusive digitalisation, RFID and radio-wave propagation in smart cities, Artificial Intelligence impacts on humans
7	**Sustainable and resilient cities**	Environmental well-being impacts analysis, role of cities in circular economy implementation, infrastructure and territorial resilience, transformative policies analysis, understanding risks.

Finally, to support the shared understanding of the ISR themes and how they contribute to the WP6 activity planning, see the definitions of these key terms, explained in table 5.

Table 5 - Defining the ISR themes.

Inclusiveness	• Inclusiveness means to provide equal opportunities, accessible services, and a sense of belonging to all residents, irrespective of their background • It points to the need for sustainability and resilience interventions to be implemented fairly on one hand, and to be the outcome of a true collective perspective based on values of mutual trust, solidarity, helpfulness and friendliness on the other • It is acknowledged that the processes of change must be built from the ground up by embedding participatory urban planning practices, and paying special attention to the voices of those in vulnerable situations. As in any change process, there is a risk to, for example, further entrench inequalities in wealth distribution, gender, age, or ethnic group.
Sustainability	• Sustainability implies that cities need to tackle jointly the three pillars of sustainable development, addressing for instance climate change by enabling a decarbonised economy, and protecting ecological systems and the services of the natural environment • Sustainability is provided by shifting from resource-based economies towards circular and higher quality economies • Concrete sustainability interventions in cities include promoting sustainable consumption and production patterns as well as paying special attention to air quality and waste management (e.g. SDG goal 11.6) • A holistic concept of sustainability point out also to meeting fundamental human needs in creating socio-economic, multicultural and long-term harmonious societies.
Resilience	• Resilience refers to the strengthening of cities to adapt, recover and thrive in the face of challenges, uncertainties and disruptions • Resilience can be built in by ensuring more redundancy and variety in essential services (e.g., in health or transportation) and enabling more local, distributed, and flexible production systems (e.g., in energy or food production) • Resilience also implies to widening risk management practices to include the interplay of complex disruptions in parallel to the ever-present climate change and its impacts: droughts, fires, storms, heat waves and floods, health and virus threats, wars and refugees from wars or other calamities, disruption of energy and food supplies, etc.

3. Learning the LbD Pedagogical Model

3.1 Description of LbD

Learning by Developing (LbD) has been systematically applied in Laurea since the early 2000´s. As a learning-centred, community-oriented, and competence-based approach, LbD has proven to be a highly scalable, flexible and relevant pedagogical innovation. Also, it has been able to constantly meet the increasingly complex needs of changing societies, with both new learning requirements and continuously developed study environments. The latest updates in the programme were made in 2022-2023.

As demonstrated in figure 2, in LbD, the students will acquire the ability to **integrate theory and practice, develop problem-solving skills and engage in critical thinking and reflection**. A diverse learning community is emphasised, equality is promoted, and individual learning needs are well recognised and addressed by encouraging peer support and enhanced studying. This future-oriented learning and competence development happens in close co-operation with professionals in working life both nationally and internationally, with an emphasis on investigative and developmental approaches to learning. Importantly, over the years, a paid key partnership concept has been developed to enhance cooperation between teaching, research, innovation, regional development, and business. This engages the partners in extensive and systematic cooperation with Laurea´s degree programmes.

Figure 2 - The LbD pedagogical model visualised.

Overall, LbD has a focus on multi-professionalism and intercultural aspects, recognising the students' professional needs and the learning expectations of their future employers in sustainable cities and communities. Most importantly, with various forms of education (daytime, evenings, multimodal, online, blended), conducted in close collaboration with the extensive network of regional and international key partners, LbD provides a versatile learning model that can also inspire the InCITIES partners with many possibilities for creating scalable pilots, a training course and different post project learning modules.
In this project, and in WP6 in particular, it is seen that the LbD model has a lot of potential in facilitating new and innovative approaches to reach the Agenda 2030 goals and beyond. That is, in this WP6, the objective is to benchmark and **learn from the many LbD related projects that have already been carried out both innovatively and successfully**. What it means is that by working on the different InCITIES key themes, the idea is to apply and adopt the best parts of the LbD model with the partners' varied needs. In practice, this leads to empowering and motivating the students, i.e., the future decision makers to take an active role in finding solutions to the urban climate change, with its many environmental, social, cultural and economic impacts, it allows the participating students and staff members to challenge their local and study-field based silos and to embrace a more holistic, innovative, and effective approach to the varied urban issues of inclusion, sustainability, and resilience as described earlier in table 5 (see the themes and sub-themes introduced in 2.3.).
Do note that a more detailed description of the different LbD methods and practices applied in partner projects and how they can be benchmarked in this WP are provided in the training course materials. This is done before going more into testing the LbD model in the two pilots (see 4.2.). In addition, the further elaborations of the LbD-focused training course (see 5.2.) – or any additionally developed post project modules that will further enhance the InCITIES collaboration beyond the project lifespan (see table 16: A list of approaches to LbD) – will also be discussed.

3.2 A futures perspective: the six (seven) pillars model

In the InCITIES Grant Agreement it is said that the deployment and scalability design for the LbD activities are made in line with the transformative frame of Six Pillars of Futures Thinking for Transforming" and that "[…] **the pillars will serve as guidelines to challenge existing structural, cultural and/or behavioural barriers** to the implementation of LbD in the InCITIES alliance.
To begin with, the frame was developed by world´s first UNESCO professor in futures studies, Sohail Inayatullah, in the late 1990's. The framework – recently updated as the stage theory of the uses of the future – is highly renowned in the field of futures studies, but less frequently applied in practice. Especially in city contexts where the futures work mostly refers to making scenarios (i.e., strategic foresight).
What earlier the framework and now the stage theory aims for is to help define which methods and tools are appropriate for which national, institutional, organisational, and personal contexts. As summarised under in table 6, where the original six pillars (see the

pillars simplified in red) were more directed toward a process, method-based approach to anticipating the future, the idea behind the stage theory (see the focus areas in blue) is more in emancipation, in bringing forth the importance of transforming the way how we think about the future and our roles within. That is why the additional seventh pillar that describes transformations in an individual level plays an important part in the updated version.

Table 6 - The six (seven) pillars framing the uses of the future (see Ketonen-Oksi (2020; 2022)[21], adopted from Inayatullah[22] (2008; 2022)[23].

1	2	3	4	5	6	7
CURIOSITY Mapping skills and knowledge to think about the future	**INSPIRATIONS** Setting goals that challenges the existing anticipatory assumptions about the future	**EXPERIMENTATIONS** Increasing the creation and uses of futures oriented information and knowledge	**CO-CREATION** Creating a shared understanding of the alternative futures, based on the uses of futures oriented approaches, methods and tools	**DEVELOPMENT** The active and impactful uses of the gained new knowledge and experiences	**ACTION** The systematic use of the created novel thinking patterns and operational models	
The used future: *mapping the current understanding about the future* **SOCIAL JUSTICE** through empowerment	The disowned future: *anticipation, seeking for disruption in the ways to look for the future* **RISK MITIGATION** as a means to see beyond risks	Alternative futures: *timing, understanding the need to shape established practices* **ALTERNATIVE FUTURES** to shift mindsets	Alignment: *deepening, creating a common language between different stakeholders* **DIRECTIONALITY** to create change with impact	Models of social change: *building alternative futures* **MAKING THE VISION REAL** is creating ownership	Uses of the future: *managing change in everyday life, transforming* **METAPHOR** that supports the new vision	**MANTRA** that opens up for transformation on an individual level

Depending on how we look at the table and whether we take the six pillars or stage theory approach on our work in this InCITIES WP6, it is good to keep in mind what Pollastri et al. (2017)[24] have previously said about city futures, claiming that **« [city] futures, generated by a polyphony of multiple voices, should be envisioned in ways that enable their inherent pluralism to emerge as a defining characteristic of the vision »**. In other words, if we aim to strengthen inclusiveness in the cities, we should think beyond planning good practices and structures, and think of how we can have an impact on the mindsets instead.
In the field of futures studies and foresight, the framework represents a transformative strand of futures that was developed after World War II but has remained fairly unknown even for many futurists for a long time. Yet, this is a very timely approach in the world today. As explained in table 7, capturing a variety of assumptions related to and types of foresight, the transformative frame basically refers to the means of enlarging the understanding of how we approach futures. It thus focuses on the interpretive structures of foresight actors and not on an outward description of activities.

[21] https://ieeexplore.ieee.org/document/9291410
[22] https://www.emerald.com/insight/content/doi/10.1108/14636680810855991/full/html
[23] https://jfsdigital.org/2022/02/28/anticipation-to-emancipation-toward-a-stage-theory-of-the-uses-of-the-future/
[24] https://www.tandfonline.com/doi/abs/10.1080/14606925.2017.1352933

Table 7 - The six foresight frames, adopted from Minkkinen et al. (2019)[25].

short-term perspective	mid-term perspective	long-term perspective
Planning frame: How to reach rationally determined outcomes?	**Visionary frame:** How to influence on the yet uncertain futures?	**Transformative frame:** How to generate new goals and better outcomes?
Predictie frame: How to produce probabilities about the future?	**Skenario frame:** How to explore alternatives for the uncertain futures?	**Critical frame:** How to interpret / question given ideas about the future?

Given that the pillars can thus be viewed as guidelines themselves, they offer a powerful tool to make foresight more approachable and less prone to its biased use, to make sense of the on-going foresight systems and capabilities and to thereby help creating the needed practices and processes to transform our cities toward inclusion, resilience, and sustainability. This is very much in line with the IDG's and how we will share the wisdom from the global work on IDGs in our pilots (see 2.1). One very useful and practice-oriented showcase of the usability of the pillars in an organisational context is described in the work by Ketonen-Oksi (2020)[26].

3.3 Key take-aways from Spring 2023

The activities of WP6 took off in M3 (October 2022). During the first reporting period (until the end of M12 (September 2023), this included a webinar series and a workshop on LbD, a lecture on futures thinking, regular team meetings and planning activities. The main events organised (see table 8) as well as the feedback and key learnings are presented in more detail in Annex III.

Table 8 - WP6 key activities in spring 2023.

Event	Time and format	Aims / Content
Webinar I	Online presentations and Q&As: 2nd of February, 2nd of March, 16th of May	Introduction to LbD: the origins and impact on regional development
Webinar II		Teacher and student experiences of practising LbD
Webinar II		Introducing and discussing different pedagogical models in the InCITIES Universities and in the PIONEER network

[25] https://www.sciencedirect.com/science/article/abs/pii/S0040162519305554
[26] https://ieeexplore.ieee.org/document/9291410

Workshop I	Showroom and on-site simulation workshop: March 22nd and 23rd	Mentoring, guidance, and support for Zilina and Lisbon teams on how to plan pilots considering the LbD practices
Workshop II	Online lecture and discussions: 8th of June	Presenting the six pillars framework – the stage theory of the uses of the future, discussing the importance of future orientation in the pilot planning (and in urban development in general)

As a conclusion from the discussions in the workshop, and in some WP6 related planning meetings thereafter, the figure 3 was initiated to clarify the interrelations between SDGs, IDGS, the six (seven) pillars approach and LbD. In short, the seven pillars approach is integrated in blue and the IDGs in golden yellow. On the left side the blue is lighter, meaning that these aims and objectives are quite hard to attain in one process. Therefore, starting with pilot case study design, **the aim is to engage the partners to a profound rethinking of their future goals.** This may be realised in the form of webinars, lectures, or workshops with an emphasis on futures thinking. In this case it refers to the associated partners and other possible ecosystem actors in the target cities.

The actual pilot execution will be effectuated in **3 stages**: First, attention should be given to introducing the students and the entire community to new ways of learning together. At best, this can be done by first mapping their different skills and knowledge to think about city futures. In this project, we prefer to do that e.g., by testing their level of futures consciousness (see Ahvenharju et al, 2019)[27]. To then also enhance this stage with the IDG approach, the reflections should include thinking on how the students relate themselves to others and the world. This is very much in line with LbD, especially when using methods that develop the students' social and interpersonal skills.

[27] https://www.sciencedirect.com/science/article/abs/pii/S0016328717301611

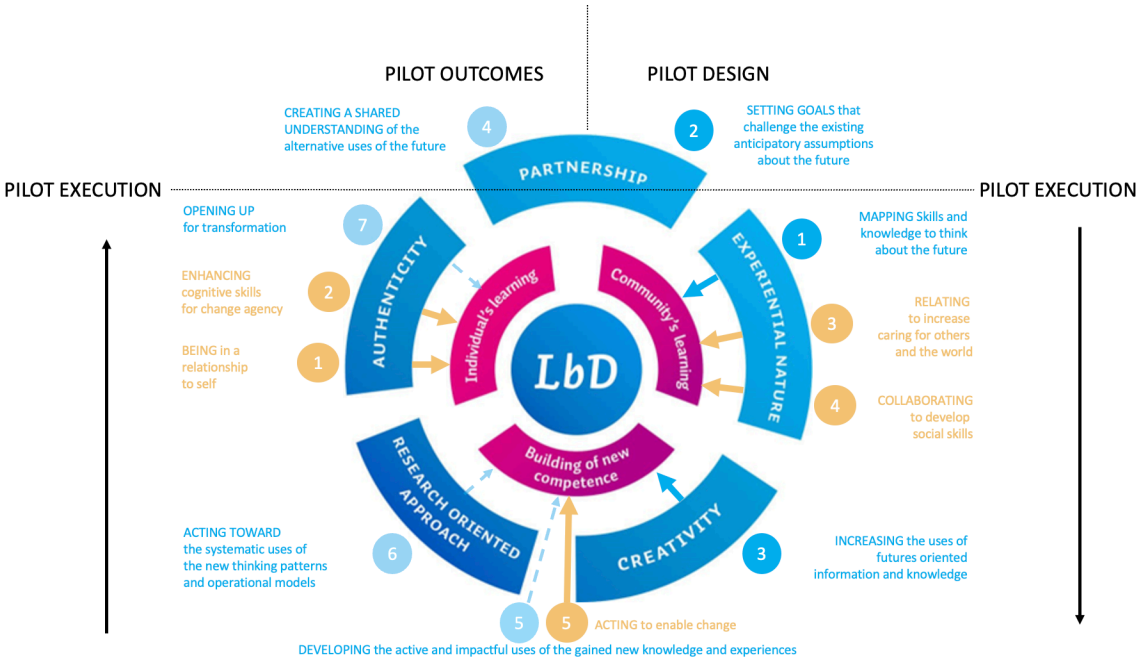


Figure 3 - An integration of LbD with IDGs and the seven pillars approach.

At the second stage, the focus turns into the means of building new competences. The LbD model in fact serves well for expanding the uses of futures-oriented information and knowledge – e.g. by introducing the students to different forms and interests of knowledge and challenging them to develop their critical-analytical approach to knowledge at hand. Or, in terms of engaging the students to play with new thinking patterns and operational models, to thus simultaneously motivate them to use scientific knowledge and to enhance their creativity in defining what is possible / plausible or not. **The main point is to create agency toward more active and impactful ways of using the future** – meaning the students should learn about their role in making the future either intentionally or unconsciously and to understand how the choice between these two often is theirs.

Once reaching toward the end of the LbD process, it would be important to take a moment to guide the students to question their own agency and attitudes toward transformation. Given the importance of working toward the sustainability goals, and considering how hard it actually is to change one's mindset or habits, this is an essential phase to make long lasting effects on the students. All in all, the question is not just simply creating solutions for certain challenges. Instead, it is about challenging the students' minds of how they approach these challenges overall and how those changes in their agency may only then result in alternative solutions for the cities. Finally, if the pilots are successful, at the end, these new solutions will be based on collective, shared understanding of how to use the futures.

That being said, it has been agreed that the following steps will be taken to strengthen the uses and understanding of the six (seven) pillars approach both as an essential part of the

pilot planning as well in the other WP6 activities underway: **a) continuing discussions about the futures perspective** and sharing about the methodological/practical applications of futures thinking across different activities, possibly with other WPs and especially in connection with the pedagogical frameworks used in the PIONEER network, **b) providing an introduction lecture or workshop to futures thinking** and transformative futures organised at the beginning of pilot courses **in Zilina and Lisbon**, **c) organising more workshops and webinars** to help implement the role of futures thinking, SDGs and IDGs in the WP6 activities, and in urban development in general.

4. Pilots co-design and study cases

The main outcomes of WP6 Task 6.3 is to design, test, run, and conceptualise a course that addresses concrete challenges faced by European cities under the overarching themes of the InCITIES project, i.e., **inclusiveness, sustainability, and resilience**. Drawing from chapter 2 and 3, this chapter aims to plan as much as possible the pilots to take place at UNIZA and later at ISCTE. Pilots should be based on the needs of a real city i.e. a study case. This chapter therefore describes and plans the outcomes of T6.3. Bullet points below are the discussion points that emerged in WP6 meetings and brainstorms:

- In pilots, the educational offer will put into practice the **identification of urban problems and the solutions to solve them**, calling on the students involved to participate in this co-creative problem-solving logic, with those who organize the school pilot and the InCITIES Associated Partners, and making use of the digital tools and advanced stakeholder engagement practices available today.
- After the process of co-creation and urban innovation takes shape among all partners, and always considering the HUBS of WP2, the structure of the school pilot will be set up, making use of its intrinsic virtues: internationalization, sharing and online and face-to-face sessions. The thematic contents will be built **according to the teaching offer already existing in InCITIES universities**, but with the flexibility to respond to the appeals that Associated Partners have placed and always focused on the solutions that the problems require, necessarily interdisciplinary and in constant dialogue with civil society, public policies and the economic field.
- **Hackathon, quizzes, kahoots, brainstorming sessions, infographics and interactive elements**, among several pedagogical offers, will constitute the teaching environment conducive to the realization of the school pilots. The selection of these tools will consider their appeal to the local, regional, national and global potentialities provided by the digital society, in consideration with the latest scientific research, public management and business innovation practices.
- The aim to build inclusive, sustainable and resilient cities with the input from the digital society will guide the LbD model to be applied in the school pilots. **Social innovation and sustainable development**, in which no one will be left behind, as defined by the UN, and capable of overcoming the reductive bipolar logic between economic growth and inequality, will be its main pedagogical locomotion logic.

4.1 Starting points for the pilots' co-design

To ensure the successful organisation of the two consecutive pilots, each of them will focus on a selection of themes from the seven thematic areas identified in WP2 (see 2.3). The first pilot will be led and hosted by UNIZA, currently targeting to take place in the spring semester of 2024 (February – May). The focus of this pilot will be on **Sustainable Mobility Transitions**, thus drawing from UNIZA and the partners' expertise in the theme. The second pilot will be led and hosted by ISCTE, and it will take place in the spring semester of 2025. The focus of this pilot will be on **City futures**. As the two pilots will be complementary, students may choose to attend either one or both. The two pilots are primarily organised for students from UNIZA and ISCTE, but both of them will be open for students from other InCITIES/PIONEER universities to join.

To facilitate the pilot organisation, including the opportunities for international student participation and study accreditation, **the pilot design is made in line with the principles of the Blended Intensive Programme (BIP)**, a mobility program running under Erasmus+. This does not only support the pilot design, defining the enrolment and accreditation, and the marketing activities (for students to participate), but also increases the opportunities for funding the international student attendance for the pilots (with ERASMUS+ funding). The boundary conditions for BIP funding are:

- online participation (from 1 hour to 1 semester) depending on the host institution
- on-site participation at the host institution (from 5 to 30 days)
- the course is worth of at least 3 ECTS (European Credit Transfer and Accumulation System) credits, either under the name of the BIP course or as one of the courses from the student's study plan
- the course must be organised as a cooperation between at least 3 partner universities (1 coordinator + 2 other partners)

Figure 4 present the four phases for the co-design of each pilot.

Figure 4 - Phases of pilots' co-design.

To begin with, **the course planning phase** addresses all logistical and administrative issues related to the successful organisation of the pilots. See table 9 below for an overview of the issues to address, and what is planned this far, including risk management.

Table 9 - Course planning, issues, plans and risk management.

Issue	Plan	Risks
Accreditation (ECTS)	• Students who join courses get ECTS credits • The aim is 3-6 ECTS per pilot (1 ECTS = 5 study hours)	UNIZA: there is little flexibility in current programs for students to pick and choose elective courses.

	• Adopting the BIP format for pilot design might make the accreditation process easier • ERASMUS+ application for BIP format	There is a need for a university-wide process to fast-track acceptance for students of all backgrounds
Student participation	• Primary target: Master´s and PhD students • Aim is to have multiple disciplines represented (social science, environmental science, engineering etc.) • Both local (50 %) and visiting Erasmus students (50 %) can join • The course is held on-site for the semester, and remote students from all InCITIES core partners and PIONEER network (as part of ERASMUS+ mobility) • The course enrols with a minimum of 15 participants • There will be 3-5 students per case study (a case study is a concrete problem to be addressed by students)	It may be difficult to attract enough students from different backgrounds to ensure diversity in each study group. ERASMUS+ mobility has long lead times which may make it difficult to sponsor enough remote students. ISCTE: electives are selected very early in each semester. There is a need to align the pilot schedule to that timetable to attract students.
Case studies	• By adopting the LbD approach, pilots will be based on concrete challenges faced a city, municipality or neighbourhood • Each pilot will engage with InCITIES Associated Partners to prepare a selection of 3 to 4 case studies which will serve as basis for group creation based on students' interests and competences	There is a need to start involving cities early to secure their commitment. Key city staff may leave or not be available at the time of the course: there is a need to prepare enough case studies as backup.
Marketing	Because the BIP format may be considered 'exotic', marketing will have to pay special attention to address student concerns e.g., fit with existing programs and formal courses, accreditation, etc. Channels for attracting students will have to be explored and listed for each institution. Those may include: • Information sent to students to enrol in electives • Dissemination in web pages of ISCTE, UNIZA, InCITIES/PIONEER partners • EU sites such as ERASMUS+ and https://civis.eu/en/civis-courses	Difficulties of communication with students. We need to ensure there is a person responsible locally whom students can meet to answer their questions and address their concerns.
Virtual course logistics	• Online courses will take place weekly for 2h at a preset time for 10 weeks, minding also for the time difference between Portugal, Slovakia and Finland • If possible, sessions will be video recorded for future use • ISCTE will host the courses and online platform See Phase 3 for more details.	There is an inherent risk with the technology in terms of usability and attractiveness. There is also a need to train the teachers to use the platform. The virtual course should be attractive, engaging and interactive.

On-site course logistics	• The on-site course will take place on week 12 (with week 11 off to allow for travelling) and will last a full week See Phase 4 for more details.	Logistics for organising on-site courses can be complex both for organisers and students (accommodation, hosting, catering, transport, costs, equipment, cultural differences, communication ..).
Partner universities	• BIP requires the participation of a minimum of 3 partners. By default, UNIZA and ISCTE are involved in preparing and teaching each other's pilot, and LAUREA is involved in the facilitation of the LbD-related processes • In practice, this means each institution will be represented and contribute in teaching the online courses and travel for the on-site week • There will be room for Gustave Eiffel and TH KÖLN to play a teaching or participating role in each BIP	Travel costs need to be appropriately earmarked ahead of time. Scheduling might conflict with other projects and priorities.
Interdisciplinary collaboration and soft skills	• There is a need for the course to address both LbD as well as improving soft skills, including teamwork problem solving, active listening, conflict resolution, and personality types • This content will be drawn from the Inner Development Goals • This will be done by organising exercises and games that encourage students to engage and collaborate together	There is evidence[28,29] that the 'covid' students may be lacking in-person teamwork and socialising skills, while they have strong online computer skills.
Learning material	Each course will include prepared material, consisting of • readings: selection of literature and/or videos as preparatory input to the course • case study material: most courses will either be based on a past case study adapted to the needs and challenges proposed by the InCITIES Associated Partners or contribute directly to the selected case studies • interactive material: Miro board (for online) or other workshop tools (when on-site) to facilitate co-learning • a prerequisite is to watch the webinars already made available by LAUREA	The learning material needs to consider the workload and the limits of 3 or 6 ECTS.

[28] https://www.unicef.org/parenting/mental-health/managing-long-term-effects-pandemic-your-childs-mental-health
[29] https://greymattersjournaltu.org/issue-2/running-on-empty-how-covid-has-affected-our-social-skills

In the second phase about stakeholder engagement (table 10), attention goes to building the case studies in collaboration with the InCITIES Associated Partners and external stakeholders. This stakeholder representation targets to include all four dimensions of the 'Quadruple Helix': local or municipal government (e.g. Planners or architects from the case study city), industry (e.g., solution providers), civil society or NGOs (i.e., some representatives of citizen interests, or it can be a local politician), and academia. Importantly, the cases will be built with a strong orientation into the future, thus applying the six pillars model as appropriate.
Both UNIZA and ISCTE will involve InCITIES Associated Partners early in the process of pilot development to identify their needs, and identify concrete challenges in concrete urban areas that can be explored in a collaborative LbD approach. A bottom-up strategy will be applied for gathering the InCITIES Associated Partners' (AP) challenges and connect these with the relevant WP2 thematics to identify the relevant BIP course subjects.

Table 10 - Stakeholder engagement, issues, plans and risk management.

Issue	Plan	Risks
Associated partners	• UNIZA: cities involved in the case study will belong to the Union of Slovak Towns and Cities (UCTS) • ISCTE will involve the Metropolitan Area of Lisbon, CP - COMBOIOS DE PORTUGAL EPE, Wegenblock Lda, Confederação Portuguesa do Voluntariado, Confederação Portuguesa das Colectividades de Cultura, Recreio e Desporto, and Inovar Autismo • According to the Grant Agreement (T6.3): "associated partners (AP number 6 to 16) will be involved as well as will involve other new partners" See chapter 4.2 for more details.	Lack of involvement of the Associated partners. There is a need to be sure we engage the AP, and for that we should create engaging activities. One example is to dynamise an AP day to engage them, where we can locally present the project ongoing activities, LbD and what we request from them.

The online courses, representing phase 3, start on week 1. This means a 11-week long engagement for the students, with weekly 2h sessions.
Although the intention here is to equip students with knowledge and tools to start the work on their case study as early as possible, the teaching itself should be also designed as much as possible in a LbD-style, interactive way: small study cases are brought in as starting points for applying the theory, or if really necessary, the theory is presented with concrete cases. For example, Sustainability Principles can be introduced by a reflection on the wider impacts of Electric Vehicles, from which principles can be derived as a group.
The courses will be planned following the template below which will be completed in deliverable D6.2.

Table 11 - Template for planning the online courses.

Week	Online session (2h)		Responsible
	Course content	Case study, exercise (LbD)	
1	Introduction to LbD and city-based case studies	*E.g. What we want to achieve with this approach*	
2			
...			
10			
11	Free (for travelling and preparing)		

Phase 4 on-site course is where 'everything comes together'. Each day is split in two halves, with mornings focused on teaching (in LbD, case-based, interactive format) and afternoons on teamwork.

Daily keynotes with consist of invited speakers from each of the quadruple helix of stakeholders (academia, government, civil society and industry). Keynotes last 30 minutes, and are open for questions for up to 30 minutes. They are scheduled in the day according to the speakers' availability, with preference given to the very start of the day to serve as inspiration for the rest of the day.

On a practical note, the scheduling of the online courses will need to accommodate the one-hour time zone difference between Portugal and Slovakia. For example, at UNIZA courses could start at 10am (to accommodate attendees from Lisbon) and end at 5pm. At ISCTE, courses could start at 9am and end at 4pm. Therefore, each session (morning or afternoon) lasts 3h, with a suggested 30min break for networking.

The courses will be planned following the template below. The content below is provided as an example only (Table 12).

Table 12 - Template for planning the online courses in week 12.

Day	Face-to-face (morning + afternoon)		Responsible
	Course content	Case study, exercise (LbD)	
1	Introduction: warm-up games, getting to know each other, expectations for the week, presentation.	Case presentations by each team; work done so far, challenges, goals for the week.	
	Keynote academia:		
2			
	Keynote government:		
3			
	Keynote civil society:		
4			
	Keynote industry:		
5	Final presentations by all student teams to all stakeholders (poster format, recorded)	Wrap-up, jury feedback, have expectations been met?	

	End. Celebratory gathering including refreshments.	

4.2 **Pilot case studies in Zilina and Lisbon**

Within the scope of the course (and InCITIES WP6 in general), our definition of an urban innovation is:

> *"The implementation of a new or significantly improved product, service, planning process, organisational structure or partnership method. Innovations do not have to be game changers or new worldwide solutions:* ***an innovation is contextual****. For example, innovations can consist of technological innovations, novel planning and appraisal processes, or ways to engage stakeholders in designing, financing, experimenting or deploying innovative solutions. Innovations are solutions: they aim to address and improve wider societal imperatives."* [30]

Drawing on the experience and vision of its associated partners, innovation and co-creation will be the first principles of relationship between all those involved in BIP. Interactively, the InCITIES project will invite its partners to reflect dialogically on the main challenges that cities face today, and specifically in a problem-solving logic, what solutions can be designed constructively between scientists, teachers, students, inhabitants, city users and city association representatives, etc. (e.g., citizen science approach) for more inclusive, sustainable and resilient cities.

Cities and their case studies are selected based on the following principles:

- The city or neighbourhood has willingness to cooperate
- Be a current challenge; refer to a topic the city is currently directly involved with
- Be of help to the city, where they may lack resources or expertise or ideas
- The case study is at a scale that a group of students can contribute within the allotted number of ECTS
- Comprise sufficient variety of tasks for students with different educational backgrounds to contribute within a multidisciplinary setting
- Where the city or the institution already has sufficient data

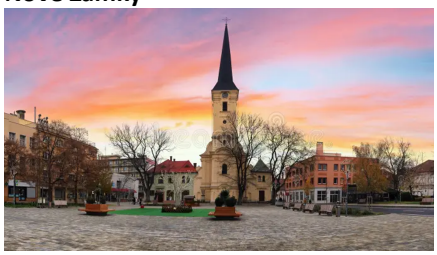
UNIZA – Sustainable Mobility Innovations case studies

UNIZA will focus on case studies relating to **Sustainable Mobility Innovations**. This refers specifically to processes of change and urban retrofitting of the passenger transport system towards best practices enabling more inclusive, sustainable and resilient mobility practices. The core of the case studies will be transport, because transport is considered an important action zone for achieving sustainable development, as it plays a significant role in the

[30] Georgouli, C., Cornet, Y., Števárová, L., Petrov, T., Malichová, E., & Yiangou, G. (2022). Urban Mobility Innovation Index 2021 Leading transformations with innovation for inclusive, sustainable and resilient urban mobility. https://www.uitp.org/publications/urban-mobility-innovation-index-2021/

economic sector. In addition, it affects the daily life of people in the city. It is among the largest consumers of energy and has a significant impact on nature and the environment in the city and the health of the people who live in it. At the same time, it belongs to sectors that develop dynamically and use the latest innovations. In this way, the case study will cover all 7 ISR themes (see 2.3).
Currently UNIZA plans to offer the following case studies in Slovakia, summarised in table 13. This table will be further developed in deliverable D6.2.

Table 13 - UNIZA case studies.

City or neighbourhood	Topic	Tasks	Primary Contact
Vlčince (Žilina) 	Safe and sustainable access to schools:	- Run and analyse survey data for school parents - Conduct traffic counting around schools - Design context-specific urban solutions and alternatives - Host workshops with parents and citizens - Air pollution measuring, e.g. before and after an experiment	Michaela Maceková (Martinska and Gorazda schools)
Nové Zámky 			Petra Višňovská
Piešťany 	tbd	(contact recently established, focus area tbd)	Daniela Piršelová (UTCS)

ISCTE - Cities Futures case studies
ISCTE will focus on case studies relating to **Cities futures** that can embrace one or several of the seven thematic areas identified in WP2. The selection of the suitable thematic areas

depends on the challenges that will be devised with the collaboration of InCITIES APs, in a bottom-up strategy implementation.
The school pilot/BIP organized by ISCTE, which can involve all InCITIES partners and PIONEER network, aims to develop an innovative perspective for the future of cities, based on the principles and pedagogical practices of LbD, involving from the outset the AP of the project directly linked to the Lisbon Metropolitan Area.
There are multiple challenges that Lisbon Metropolitan Area faces, and with which it can benefit from the development of this project and in particular from the realization of this BIP Cities Futures.
The disciplinary areas that ISCTE can offer to Future Cities school pilot/BIP are the following ones: social sciences, informatics, data science, information systems, public policies, architecture and urban studies, business and marketing.
To link the implementation of the LbD to SDGs and the IDGs in the pilots blended intensive programs (BIP) it will be considered the following approaches and strategies. ISCTE will promote a Hackathon during the Lisbon' BIP/school pilot to help engage the learners, and it will be structured around the following outlines (Table 14).

Table 14 - ISCTE proposed case studies structure and contents.

Structure	Content	Format	SDG
Introduction	Definition: What are future cities and why are they important in the 21st century? Significance: Developing futures consciousness and agency toward the future. Inner Development Goals and inclusion.	Online	
Historical Context	The Modern Era The Digital Era	Online	
Characteristics of Future Cities			
Sustainability	Active Engagement: Encourage students to actively participate in sustainability initiatives, such as community clean-up events, circular economy, participatory decision-making or energy conservation projects. Involve them in the planning, execution, and evaluation of these activities	Face-to-Face	SDG11
Energy-Efficient Buildings	Hands-On Workshops: Organize workshops where participants learn about energy-efficient building technologies	Online	SDG7
Smart Technology	Innovation Challenges: Engage students in innovation challenges related to smart city technology. Encourage them to design and prototype solutions that address urban challenges, such as traffic congestion or waste management	Online	SDG9

Blockchain for Social Good	Blockchain Projects: Collaborate with students to study the development of applications that address social and environmental issues. These could include transparent supply chains or voting systems projects	Online	SDG9
Inclusive Social Design	Community Workshops: Host inclusive design workshops where community members, including vulnerable groups, actively participate in designing public spaces or services. Ensure their voices are heard in the planning and design processes	Face-to-Face	SDG10
Resilient Social Design	Resilience Projects: Initiate community-based resilience projects, such as flood preparedness efforts or climate-resilient infrastructure development. Involve residents in risk assessments and adaptation planning	Face-to-Face	SDG11
Disaster Preparedness and Risk Management	Community Drills: Organize disaster preparedness drills and simulations for community members to actively participate in. Co-create with them essential skills for disaster response and management	Face-to-Face	SDG11 SDG13
Public Spaces	Community-Led Revitalization: Encourage residents to actively engage in revitalizing public spaces. Organize community clean-ups, art installations, or events that bring people together to improve public areas	Face-to-Face	SDG11
Challenges Faced by Future Cities			
Climate Change	Interdisciplinary Projects: How to Strengthen resilience and adaptive capacity to climate-related hazards and improve awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	Online	SDG13
Economic, Social, Political and Cultural Inequalities	Interdisciplinary Projects: How to empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status	Online	SDG1 SDG10 SDG11
Technological Risks and Opportunities	Brainstroming sessions about the challenges for AI, Machine Learning and knowledge platforms like ChatGPT	Online	SDG9
Well-Being and Development	Interdisciplinary Projects: Foster collaboration between students or community members from various backgrounds to address these challenges. Encourage them to develop innovative solutions that incorporate social, economic, and environmental aspects Integrate SDGs: Infuse SDGs and sustainability topics into educational curricula across disciplines. Encourage students to	Face-to-Face	SDG3

	explore sustainability challenges through research, projects, and community engagement	Online	
Case Studies about Future Cities			
Selection of Case Studies Case Cities	Choosing cities with diverse urban development challenges and future-oriented initiatives that align with sustainability, inclusivity, and resilience goals	Blended	
Data Collection	To gather comprehensive data on each city's current urban planning, policies, technological advancements, and community engagement efforts	Blended	
Analysis	Analyse the collected data to identify trends, successful strategies, and areas for improvement in each case city's journey toward a sustainable and inclusive future.	Blended	
Compare findings	Compare the findings across case cities to draw insights into effective approaches and common challenges in urban development.	Blended	
Recommendations	Based on the analysis, provide recommendations and best practices that can guide future city planning and policymaking to achieve long-term sustainability and inclusivity objectives.	Blended	
Looking Forward: The Next 50 Years			
Future Visioning Exercises	Encourage students to create future city visions. They can sketch out what a sustainable and inclusive city might look like in 50 years, considering architecture, transportation, energy sources, and social structures. This hands-on approach allows them to think creatively and develop a concrete image of their aspirations.	Online	
Interdisciplinary Collaboration	Promote interdisciplinary collaboration among students from various fields of study. Encourage them to work together on projects that address complex urban challenges from multiple angles. This approach helps students appreciate diverse perspectives and fosters holistic problem-solving.	Online	
Regular Future Reflections	Incorporate regular future-focused reflection sessions into the curriculum. Encourage students to revisit their long-term visions and adjust them as their understanding of the future evolves.	Online	

The main goal is to create a dynamic learning environment that promotes practical skills development, critical thinking, and a sense of responsibility for building sustainable and resilient future cities.

These strategies empower students to think critically, collaborate effectively, and maintain a forward-looking mindset as they prepare to contribute to a sustainable and inclusive urban future over the next five decades.

The objective is to foster critical thinking, promote interdisciplinary learning, and encourage students to engage actively in their communities. This approach will provide opportunities for reflection, discussion, and ongoing assessment to ensure that students grasp the complexities of building inclusive, sustainable, and resilient future cities and understand their roles in the process.

4.3 Implementing LbD in the pilots

The pilots co-design will follow the principles of the Learning by Developing (LbD) methodology emphasizing learning through practical, hands-on experience and the development of real-world projects and solutions. They will prioritize active learning, problem-solving, and application of knowledge in real world contexts.
The key principles of the application of the LbD are presented in figure 5.

Figure 5 - Key principles of the LbD application in pilots.

The design of the pilots will take in consideration the active engagement of the students, allowing them to take on roles as creators, builders, or problem solvers, in order to transforms them into active agents in their own education.
The learning process will be **based on real-world problems** for a better understanding of the value and relevance of the topics, connecting theoretical knowledge to tangible situations. In

this respect, the Problem-Solution approach will be used to identify solutions for complex, real-world problems and challenges, oriented by the IDGs framework and the six (seven) pillars model.
Additionally, the interdisciplinary approach will be crucial for the integration of knowledge and skills from various disciplines, to look at the complex issues from different perspectives. Collaboration is a key component, as working in teams to tackle these problems and find solutions will be essential. This will enhance teamwork, communication, and interpersonal skills.
Moreover, reflection and iteration will promote the integration of experiences, embracing both failures and successes as valuable learning opportunities.
Lastly, mentorship and guidance will play a crucial role, as it will be intending that mentors will be actively involved in guiding students through the learning process. The mentorship further enriches the overall learning experience, providing a supportive framework for growth and development.
The specific topics of the pilots emerge from research done on WP2 based on the student-led research projects, faculty-led research collaborations, and research-driven coursework, as represented on table 15.

Table 15 - Research-based learning (by developing) for the pilots design .

Research-Based Projects	Faculty-Students research projects to investigate real-world problems regarding inclusive and sustainable cities.
Interdisciplinary Research	Interdisciplinary approach to research by students and researchers which allows to draw on multiple fields of study to address complex issues regarding the cities of the future.
Capstone Projects	Capstone projects that require students to synthesize their learning and conduct research to solve problems or explore specific topics in depth.
Community-Engaged Research	Research topics identified by the relationship of universities with local communities leading the students research topics.
Research Conferences and Publications	The publications in conferences and other outlets, also allows an understanding of the topics relevant to select for the pilots.
Research-Driven Courses	The pilot course are to be designed around research questions lead by the challenges provided by the InCITIES Associated Partners and/or projects in development by faculty and students.

By integrating research from WP2, the IRS themes, into the LbD framework of the pilots, can create a dynamic and enriching learning environment where students not only apply their knowledge but also contribute to the advancement of knowledge in the field of Future Cities.

Application of the Learning by developing

The application of the LbD to the pilots' intents to foster an active learning, critical thinking, problem-solving, and the application of knowledge in real-world contexts, strengthen the relationships with university and the stakeholders. In this context, the application of LbD will be done through several pedagogies in both pilots (ISCTE and UNIZA), as showed in figure 6.

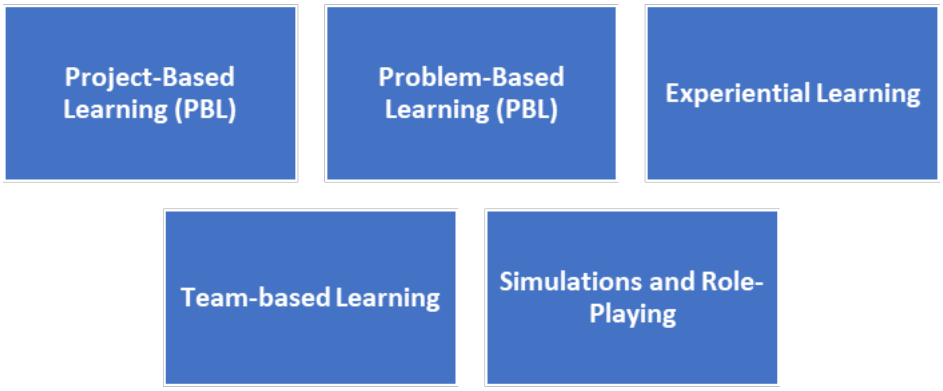


Figure 6 - Application of Learning by developing.

Furthermore, to enrich students' understanding of the subject matter, it will be included supplementary resources like articles, books, research papers, or external links. These materials will provide additional depth and context, allowing students to explore the topic from multiple perspectives.

To establish practical relevance, the pilots will incorporate **real-life scenarios and case studies**. This approach enables students to see how the concepts they're learning can be applied in real-world situations.

Lastly, it is important to design strategies to encourage students to actively participate in discussions in person and online, in this case by creating platforms like discussion boards or forums where they can ask questions, share insights, and collaborate.

These strategies for creating the learning materials allows them not only to be informative but also engaging, and interactive enhancing the overall learning experience.

5. Capacity building

5.1 The Capability Maturity Model Integration process

As promised in the Grant Agreement, the most important, a concrete outcome of this work package will be **an online training course.** However, the course does not only serve as an introduction to LbD and its implementation, but it serves as an essential **starting point to the Capability Maturity Model Integration process** – thus referring to the effective and engaging implementation and scalability of the LbD model in practice, in the context of ISR cities. In other words, besides collecting and summarising all the lessons learned during the WP6 execution, the training course is also an important tool in **ensuring that the work done in WP6 will have an impact beyond the project´s** lifetime. Finally, the project contemplates an InCITIES Observatory that gathers all the acquired data about inclusion, sustainability and resilience in cities, thus referring to T6.2 (knowledge base for ISR cities).

Given the experiences and feedback from spring 2023 activities (see under in figure 7 and in more detail in Annex I), the InCITIES consortium concludes that the PIONEER institutions[31] would best benefit from a course format which builds strongly on the exchange of ideas and practices in the ISR cities context, on a very concrete level. This could happen alongside the training course, as an integral part of the Capability Maturity Model Integration process. For example, by continuing the well-received InCITIES webinar series with teachers and other pedagogy experts to discuss their real-life challenge-based cases – or, through shared method and tool development processes.

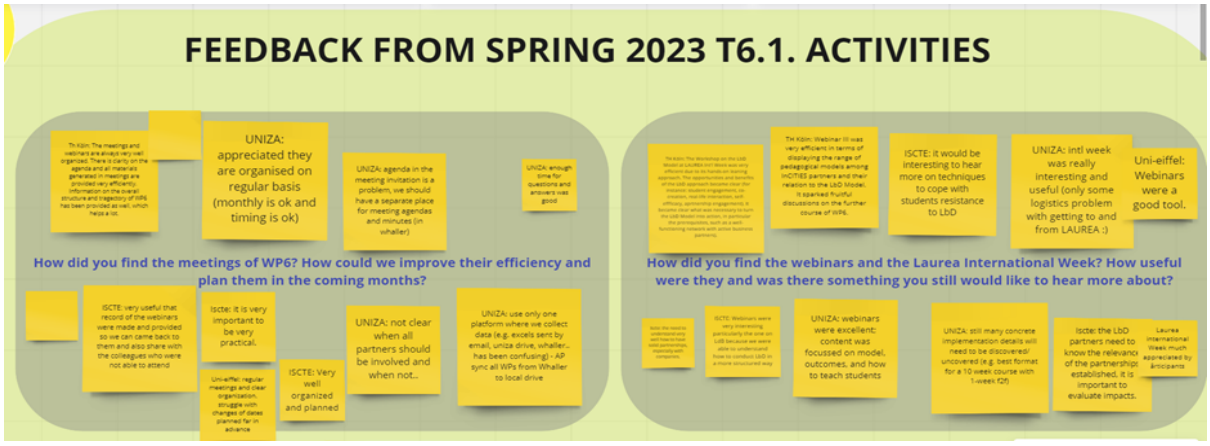


Figure 7 - Experiences and feedback from spring 2023 activities, done in the Miro board application.

To succeed in these aims, the question comes to the role of LbD vis-à-vis other pedagogical models that are in use in the InCITIES partner universities, with varying intensity and roles (see table 16). Even though the WP6 team members highly agree on the usability and

[31] https://pioneer-alliance.eu/

effectiveness of the LbD approach to teaching topics that relate with ISR cities, the point of InCITIES is not to roll out LbD. Rather, it is **to build the foundations for a roll-out of experimental challenge-based future projects and courses** which is not an easy task, and where the best results are rarely based on one model solely. This has been a regular issue coming up in the webinars and other WP6 meetings, and must be carefully thought through when planning the coming capacity building activities.

Table 16 - An overview of the challenge-based approaches currently in use in the InCITIES universities.

Institution	Examples of challenge-based approaches in use	Current state-of-affair
LAUREA	LbD	An institutional approach
TH KÖLN	Problem-based, project-oriented and inquiry-based learning	The handling of challenges is addressed at different levels of complexity. This level of complexity is increasing for both students and teachers. These challenges usually affect real social issues and are backed up by (internal) research (including SoTL[32[1]] and SoAD[33[2]]).
GUSTAVE EIFFEL	Field work projects	The Engineering school in Geographical information and Geomatics designed a comprehensive learning by projects framework allowing learners from bachelor 1st year to Master, 2nd year, to develop knowledge and skills through engaging projects that address challenges and problems they may face in the real world. For example, in their 4th year, regarding programming, learners in collaboration with external stakeholders (public, private entities), innovation incubators (Green Tech Verte, Descartes) or technical accelerators, develop a software that can be a prototype, a web application, a graphical user interface or a software component.
UNIZA	Examples of similar approaches applied at UNIZA besides traditional approaches: problem-based learning (the class works on the problem in a planned way, as a whole or in teams), project-based learning (students designing, developing, and constructing hands-on	There is not one prevailing educational approach. The fields at UNIZA are connected with education focused on real-life issues, design and products. The faculties and departments implement various approaches according to concrete needs and challenges within their specialisation. Technical fields

[32] [1] SoTL = Scholarship of Teaching and Learning: SoTL is a program that encourages teachers at universities to ask questions about their own teaching and student learning and to answer them in a scientific way. The aim is to systematically reflect on and change specific teaching and to enter into dialogue with the specialist community.
[33] [2] SoAD = Scholarship of Academic Development = The professionalisation of academic developers, i.e. people who are not teachers of subjects, but employees of different institutions to improve teaching through further training of teachers and/or support for didactic developments (curricula, courses, methods) and/or "quality management".

	solutions to a problem, often real-life oriented), interactive approach (e.g. for foreign language education, involving f2f interactions student-teacher, student-student), experiential approach ("learning by doing": students learn in companies, labs,etc.)	apply their methods, human sciences apply their own. There is an intersection or common methods, but it is hard to call it an approach.
ISCTE	Problem-based, challenge-based, project-oriented, experiential, learning by doing, usually in student teams, company internships	Applied unit courses both in the 1st cycle and 2nd cycle degrees in the ISCTE technology and architecture school, social sciences school, business school, applied digital technologies school, and sociology and public policy school. The ISCTE schools apply problem-based, project-oriented, experiential and learning by doing, usually in student teams, approaches. The students are presented with a real problem from the community (companies, NGOs, etc.), through a participatory design involving as much as possible the target users, leading to the design and development of a proof of concept.

Indeed, to support the planning process, some highly solution-focused ideas have been brought up to work upon in the coming months. Here some of the highlights, extracted from the spring 2023 feedback:

- "We already use the approach but don't call it this way (project-oriented teaching process)"
- "We cannot switch all courses to LbD-style."
- "We also have some courses that already use a similar approach although we also don't call it LbD. The main problem is to establish a good link between the course and [stakeholder] partners"
- "What are the additional aspects of LbD to consider that are not part of currently used project-based approaches?"
- "We expect it would be similar to the webinars, but with practical exercises, i.e., a chance to practice LbD as well."
- "Would changing courses to LbD approach require new [national agency] accreditation?"
- "Should LbD be incorporated only in the study programs or in teaching the staff internally as well, and would this need some kind of in-person seminar?"
- "[It is] important not to limit to InCITIES partners but to extend to Pioneer alliance members and beyond."
- "The pilots have to involve the associated partners. This can help to establish a know-how in the process of involving the stakeholders beyond the project lifetime."

- "We should make the best of use of the activities supported by Erasmus+"
- "Endogenous resources are needed to build up and sustain the platform."

In addition, important feedback was given about the scalability of LbD, the need for a comparative pedagogical analysis, and the integration of futures thinking into LbD. These notes included, e.g., LbD Index or checklist, futures thinking as an iterative process, state-of-the-art research on pedagogical models, models and scalability of LbD to whole programs and course design.

5.2 Planning the online training course

Importantly, to support the training course design during the project, it has been discussed that the following ideas would be further elaborated in M12-M18 (September 2023 - March 2024):

- **Surveys**: The surveys would enable InCITIES to better evaluate if the LbD type of models are popular among teachers, whether its integration could be strengthened, or to foresee opposition that might emerge for their application in the future.
- **A catalogue of existing challenge-based ECTS-bearing student projects**: To increase LbD's representation in the consortium it would be good to share what has been developed with local ecosystem stakeholders (ideally with ISR cities-related focus).
- **Dialogue between teaching staff and expertise centres:** Discussing the pedagogical approaches used at member institutions (e.g., entities dealing with curriculum development), making sense to what extend the LbD model is familiar at InCITIES members and represented in teaching practices and what kinds of or to what extend its introduction could face challenges.
- **Feedback loops with the ecosystem representatives:** Motivating LbD model application could be achieved through interactions with ecosystem stakeholders on their needs and challenges and how they could be integrated in curricula and challenge-based collaborations.
- **Evaluation**: To make use of the experiences from the pilots and the training course, a custom-tailored evaluation should be conducted to different target groups, i.e., to collect data on the reception of the LbD model by the different stakeholders. The results should then be a) integrated into the further planning processes of the joint LbD-related activities, and b) shared on a follow-up Webinar for InCITIES partners (lessons learned).

At the same time, the pedagogical collaboration beyond the project should also be discussed, on various levels. For one thing, the training course should be designed in ways a) to enhance the exchange of information and experiences and b) to further test the challenge-based educational projects. To attain these goals, the following ideas have been brought up:

- **Webinars**: The webinars could share insights on challenge-based learning, case studies, best practices, and innovation. The information about these webinars should be spread to all faculties across the PIONEER institutions.
- **Online forum for teachers**: Bringing together teachers from different InCITIES member institutions would help to experiment and implement innovative challenge-based teaching and learning formats.
- **Shared educational projects**: Whether virtual or in-person, the training course would benefit from having a set of other specific educational projects aside, such as joint student workshops, BIPs, VEs, or COILS. With multiple institutions (and disciplines) involved, this would allow to familiarise the faculty members with the challenge-based teaching techniques, methodologies, strategies and diverse cultural educational contexts. As teachers consequently acquire new skills, they would become multipliers at their own institution.
- **Pedagogical collaboration**: Integration of pedagogical collaboration into the activities of the PIONEER alliance, such as staff weeks or work group meetings.
- **Conferences**: Organising conferences that focus on the challenge-based pedagogies and their application with ISR cities related topics, including ecosystem stakeholders.

What then comes to the concrete training course format, it could be as follows:

1) Define necessary pre-requisites to apply LbD to a course
2) Explain its general pedagogical principles
3) List what needs to be in place to make it work
4) Provide a timeline with necessary steps to set up LbD model for a course (i.e., what needs to be done and when)
5) Provide model syllabus of an LbD based course and its different phases
6) Address needs of the different stakeholders
7) Provide evaluation tool for an LbD based course and its learning outcomes
8) Provide information about potential pitfalls
9) Provide case studies with best practices, ideally from the ISR context (i.e., broad principles), a manual for application and for illustration

As far as the course format goes, partners wished to have an info bank type of course with recorded videos, online learning materials and a record of all ISR-related courses done with the LbD approach. Also, experiences from the pilots should enrich the course materials.
In terms of course interaction, it has been stated that it might be most feasible and sustainable to develop a training course that does not require any "live" involvement of/ interaction with a person but is fully based on videos and documents (manuals, checklists, questionnaires, etc.)

5.3 One step further – a shared curriculum

A specific question arising during the spring 2023 WP6 discussions was about the ways how the pilots relate to the task of creating a shared curriculum. However, to establish a shared curriculum for the InCITIES partner universities is a complex goal that requires facilitation of a number of administrative, logistical and legal challenges and obstacles. In that sense, while specific in their nature and context, individual educational activities, such as **the two InCITIES pilot courses, can serve as a test bed and facilitators for the development and implementation of a shared curriculum**, in that:

- Collaboration on educational projects is practised across institutions and various status groups prior to, during and after the pilots.
- Timelines that are in line with various academic calendars are set and tested as they apply to developing, marketing and enrolling students in a shared educational project.
- InCITIES partners jointly work on logistical challenges regarding the pilots. Lessons learned can be passed on.
- Familiarization between faculties, administration, institutional frameworks and ecosystems takes place across InCITIES institutions.
- InCITIES partners forge relationships among various status groups that can be beneficial for building a shared curriculum.
- Curricula that are in part virtual, are based on the LbD approach and address ISR city topics are developed. Their efficiency and popularity with students is tested.
- Course frameworks, such as LbD-based assignments, the workload attached to the course, or submission formats and deadlines, are tested within the consortium. Conclusions can be applied to future courses.
- InCITIES partners put mobility in place and develop/apply mechanisms that can be replicated more easily in future iterations.
- The pilots provide opportunities for feedback from various status groups that can benefit subsequent iterations.
- InCITIES partners test ISR topics and challenges and their popularity with stakeholders and students.
- InCITIES is able to garner feedback from stakeholders involved in the pilots on their curriculum.
- This collaboration provides an opportunity to learn about the needs of these stakeholders, to find ways to attract them to join the educational activities, to build trust to encourage partnership at the European scale, to align and coordinate

ecosystems stakeholders and scholars in order to share a common vision, agenda, vocabulary, and set up cooperation rules to co-create value and manage conflicts, to ensure value co-creation and develop ways to maintain and renew stakeholder's engagement.

- Based on the complexity of developing the pilots, one can draw conclusions as to what effort and time needs to be invested to integrate newly developed courses into a shared curriculum.

ANNEX I - WP 6 spring 2023 activity feedback

The feedback was provided on the Miro[34] board online application, during 2 months, between mid-June to mid-August 2023.

How did you find the meetings of WP6? How could we improve their efficiency and plan them in the coming months?

- "The monthly meetings and webinars were found very well organized, with a clarity on the agenda, and the meeting materials were provided very efficiently. The provided information on the overall structure and trajectory of WP6 was found helpful."
- "Meeting invitations with the agenda were asked to be added in Whaller as well."
- "To have enough time for questions and answers during the events were appreciated."
- "Webinar recordings were appreciated – one could come back to them and also share them with those colleagues who were not able to attend."
- "Practicality as well as sticking with the planned dates were emphasised."
- "Also, clearly indicating when all are to attend and when not."

KEYW0RDS: Clarity, time management, practicality, one platform

How did you find the webinars, showroom and workshops? How useful were they and was there something you still would like to hear more about?

- **"**The Workshop on the LbD Model at Laurea International Week was very efficient due to its hands-on leaning approach. The opportunities and benefits of the LbD approach became clear (for instance: student engagement, co-creation, real-life interaction, self-efficacy, partnership engagement). It became clear what was necessary to turn the LbD Model into action, in particular the prerequisites, such as a well-functioning network with active business partners."
- "Webinar III was very efficient in terms of displaying the range of pedagogical models among InCITIES partners and their relation to the LbD Model. It sparked fruitful discussions on the further course of WP6."
- "It would be interesting to hear more on techniques to cope with students resistance to LbD."
- "Laurea International Week was much appreciated by participants."
- "Laurea International Week was really interesting and useful."

The webinars were considered a good, even excellent, tool where content was focused on model, outcomes, and how to teach students. Especially the LbD webinar was interesting as it helped partners to understand how to conduct LbD in a more structured way**.** The additional wishes included the following: The LbD partners need to know the relevance of the partnerships established, also it is important to evaluate impacts and how to develop solid partnerships, especially with companies. Many concrete implementation details still need to be discovered/ uncovered (e.g. best format for a 10-week course with 1-week face-to-face)

KEYWORDS: Webinars and LbD workshop beneficial, students' resistance to LbD, partnership related topics, concrete implementation details

Other comments, hopes, and wishes to improve WP6 collaboration in the coming 6 months

[34] https://miro.com

- "How could we involve the representatives of the students in the WP6?
- "How to deepen and improve interactions with other WPs, especially with WP2?"
- "To provide a clear inventory of documents of WP 6 in Whaller (agenda, zoom links, miro board, deliverables in progress, etc.)."
- **"**To keep enough time for exchanges and discussion and stick to planned meetings as much as possible**."**
- "Future deliverables should be planned ahead so that a draft version is ready one month before the deadline so that it can be reviewed timely by the partners**."**
- "Also, planning meetings with an [event planner, such as] Doodle so that the availabilities of the colleagues concerned by the activities are considered."
- "The need to engage LbD partners, outside universities, in more close and long-term relationships."

KEYWORDS: WP interaction, student and LbD partner involvement, Whaller focus, planning ahead

How do tasks 6.2. (knowledge base creation) and 6.3. (pilots) contribute to the final deliverable T6.4. InCITIES training course?

A: How to connect the T6.2. activities to the InCITIES training course, e.g,. by providing research data also valid for the course? What else could it be?

- "The project contemplates an InCITIES Observatory, that will gather data about inclusion, sustainability and resilience in cities"
- "The point of InCITIES is not only to roll out LbD, but it is to support teaching of key topics around ISR cities in an effective way, which we think is best done with the LbD approach"

KEYWORDS: Inclusion, sustainability and resilience in cities, supporting teaching around ISR cities

B: How to organise the InCITIES training course? What needs to be considered?
What do we expect from the training course? How could it best serve and be useful for a) your own organisation, and b) to the InCITIES (and also to the Pioneer) consortium? What about the stakeholders?

- "The pilots have to involve the associated partners. This can help to establish a know-how in the process of involving the stakeholders beyond the project lifetime."
- "We should make the best of use of the activities supported by Erasmus+."
- "We already use the approach but don't call it this way (project-oriented teaching process)."
- "Important not to limit to InCITIES partners but to extend to Pioneer alliance members and beyond."
- "Also to notice: "We cannot switch all courses to LbD-style."
- "What are the additional aspects of LbD to consider that are not part of currently used project-based approaches."
- "We also have some courses that already use a similar approach although we also don't call it LbD. The main problem is to establish a good link between the course and partners"
- "We expect it would be similar to the webinars, but with practical exercises, e.g., with chance to practice LbD as well."

KEYWORDS: LbD vs. other pedagogical formats, Erasmus+, practical exercises

Should we include comparative analysis about LbD and other pedagogics to our course format? Does it need to be scalable? How should we integrate / train futures thinking in the course format?

- "Futures thinking can be integrated as an iterative procedure (step by step)."
- "Could be nice to have a kind of LbD "index" or checklist to qualify the level of implementation of LbD for a specific course."
- "Same as teaching back-casting or vision-based project mgmt, e.g., have two groups, one with the task to forecast a future solution and one with the task to envision an ideal future and define the steps towards it (and to show the different results in the two approaches)."
- "It will be worthwhile to have a state-of-art about pedagogical models, especially the ones more advanced to deal with the current digital society. LbD should be in the forefront of the new educational and research challenges."
- "Scalability, to what extent the LbD approach can be applied to whole programs; we should try to make it scalable."
- "Could scalability be achieved through provision of fundamental principles of LbD course design in the training?"
- "It might help to include the names of pedagogical models that apply roughly comparable principles and state how they relate to LbD (e.g. service learning, experiential learning)."

KEYWORDS: Iterative procedure of futures thinking, LbD Checklist, state-of-art pedagogical models included, scalability

What type of platform do we use for the training course? Open access? MOOC style? What about who owns and updates the platform after InCITIES project

- "We should use the endogenous resources that we already have, for instance, the Moodle platform. ISCTE is analysing the possibility of hosting the InCITIES courses."
- "We only do in-person teaching (online using Teams) and this is the way courses are accredited (UNIZA)
- "We can incorporate this in the study programs somehow, to teach LbD internally (to staff)."
- "How to make a LbD course for UNIZA staff attractive and relevant? Probably something more is needed than the webinar approach, e.g., some kind of in-person seminar."
- "Would changing courses to LbD approach require new accreditation?"

KEYWORDS: using already existing platform, how to incorporate in the study programmes and staff training, accreditation questions

What would be an ideal format for the training course? "Info bank" style? What type of info needs to be included? Should we have different contents for lecturers, researchers, stakeholders etc.? What are the materials that we can bring here from T6.2, and T6.3.?

- "Training course could for instance 1-define necessary prerequistes to apply LbD to a course, 2-explain its general pedagogical principles, 3-list what needs to be in place to make it work, 4-provide a timeline with necessary steps to set up LbD model for a course (i.e.: what needs to be done when), 5-provide model syllabus of an LbD based course and its different phases, 6-address needs of the different stakeholders, 7-provide evaluation tool for LbD based course & its learning outcomes, 8-provide potential pitfalls, 9-provide best practices case study, ideally from the ISR context, i.e., broad principles; manual for application; case study for illustration."
- "In terms of sustainability the course could combine an info bank with recorded videos (along the lines of a typical LinkedIn course, for instance)."
- "Keep and share a record of all ISR-related courses done with LbD approach; video-record the workshop part?"

- "We should enrich the training courses with the experiences (and the cases studies?) from T6.3 (pilots)."
- "Videos, online learning materials, tutorials, chat channels, zoom meetings, presentation of data and research results. Making the best use of the digital society."

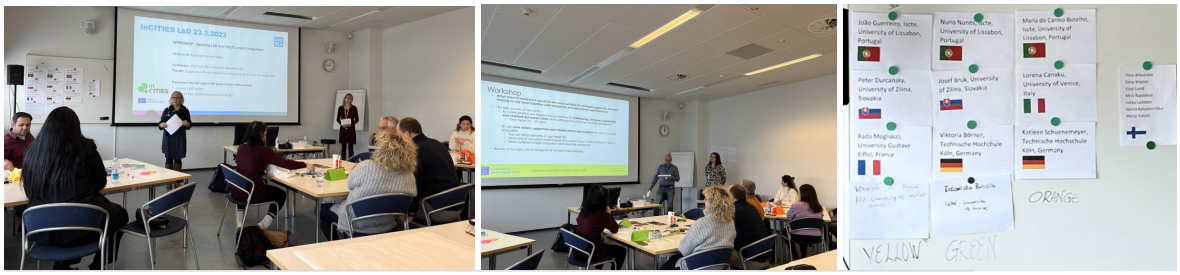
KEYWORDS: How to apply LbD to a course, info bank with recorded videos, recorded workshops and pilot materials, digital applications

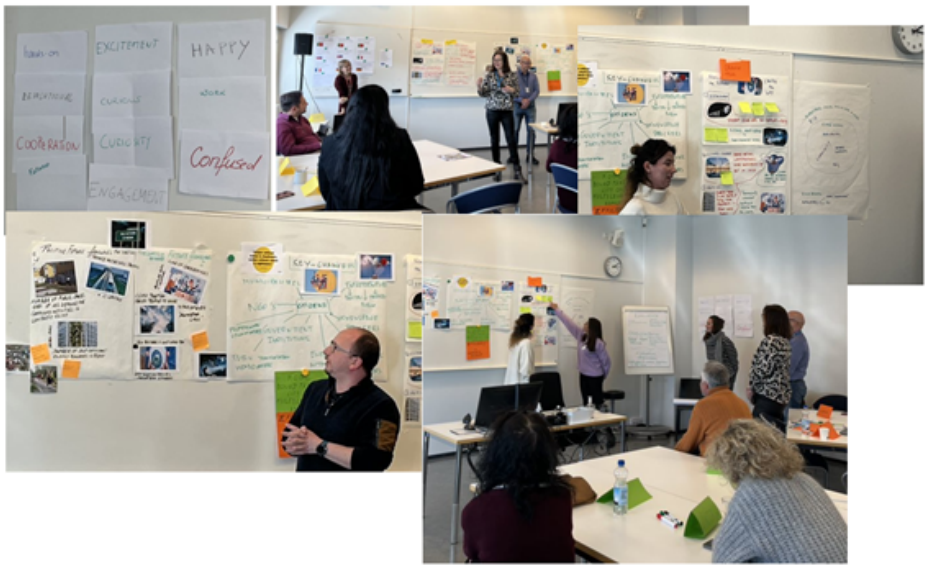
What is the level and format of interaction? Who manages the possible discussions?

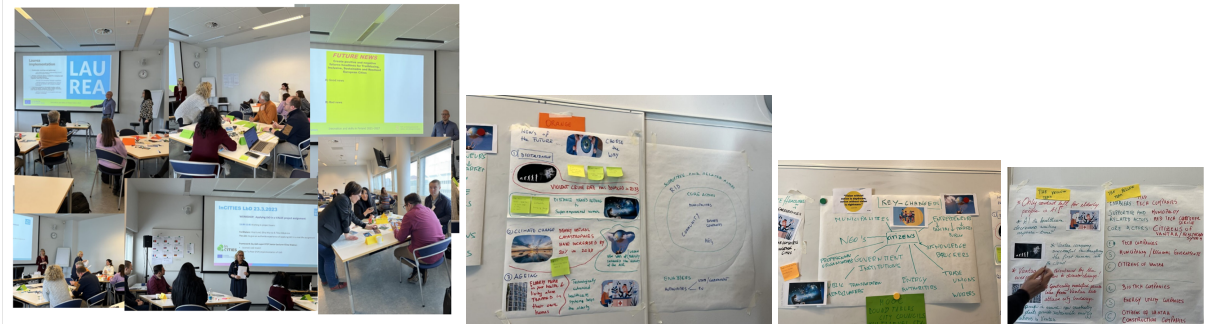
- **"**It might be most feasible and sustainable to develop a training course that does not require any "live" involvement of/interaction with a person but is fully based on videos and documents (manuals, checklists, questionnaires, etc.)**."**
- **"**Open interactions between all the partners of the pilot plans."
- "Fruitful combination of physical and digital interactions."

KEYWORDS: interaction automatic after course, during course open interaction

ANNEX II - The LbD simulation workshop







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ANNEX III – Webinar summary presentation

WEBINAR I:

The elements of the Learning by Developing pedagogical model and on its applications in regional collaboration

WEBINAR II:

The practices of Learning by Developing pedagogical model in teaching: the lecturers´ and the students´ perspectives

WEBINAR III:

Discussing and sharing experiences of alternative models and methods used in the Pioneer consortium, learning from each other

Funded by the European Union

May 16th

Webinar III: Learning by Developing pedagogical models in ISR cities

Timezone: CET

14:00 **InCITIES WP6 status update and what next** (Sanna Ketonen-Oksi, Laurea)

Alternative models used in the Pioneer consortium

14:15 **Practices related to challenge-based learning** (Nicolas Paparoditis, Gustave Eiffel)
14:25 **TH Köln - learning university and its pedagogical mindset** (Julia Gerber, TH Köln)
14:35 Discussion: Questions and comments for Nicolas & Julia

Institutional objectives for the INCITIES project implementation

14:50 **The pedagogical model of ISCTE? An overview** (Joana Alexandre, ISCTE)
15:00 **JOB LABS methodology based on 5E pedagogical model** (Josef Bruk & Albert Kulla, UNIZA)
15:10 Discussion: Questions and comments for Joana, Josef & Albert

Discussing pedagogical research and collaboration in the Pioneer consortium / in ISR cities

15:25 **Strategising the future collaboration in ISR cities: drafting the WP6 training course** (Tiina Wikström, Laurea)
15:35 Reflections: Time for questions and comments

Expectations for Pioneer collaboration?
Other pedagogical models?
Usability of LbD with other models?

Contents

A short introduction to futures thinking

- **Futures thinking and foresight (in brief)**
  - ⇢ Time frames, different approaches
  - ⇢ Why futures thinking and foresight
- **Futures orientation – building resilience**
  - ⇢ Individuals vs. organisations vs. systems
  - ⇢ Opening up to alternatives
- **The six (seven) pillars framework**
  - ⇢ Presenting the framework
  - ⇢ Discussing the usability of the framework in ISR cities

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Acronyms

AB – Advisory Board
AGA – Annotated Model Agreement
AP – Associated Partner
CA – Consortium Agreement
DMP – Data Management Plan
EC – European Commission
GA – Grant Agreement
GB – Governing Board
LbD – Learning by Developing
MB – Management Board
PC - Project Coordinator
PO – (EU) Project Officer
RP - Reporting Periods
WP – Work Package
WPL - Work Package Leader