



Sustainability & Digitality

Learning and Teaching

Package 2

UNIT 4: A FUTURE WITH OR WITHOUT TECHNOLOGY?

JUDITH NEUTHARD, TECHNICAL UNIVERSIY DARMSTADT
NINA GRÜNBERGER, TECHNICAL UNIVERSIY DARMSTADT



Co-funded by
the European Union



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Overview

The Learning and Teaching Package introduces the relationship between digitality and sustainability. Knowledge and pedagogical materials on topics such as harmful effects of digital technologies on the environment, the importance of digital technologies to deal with the climate crisis, and the social inequalities and social dependencies arising from digital infrastructures are addressed.

Whereas the previous Units introduced basic knowledge about the relationship between digitality and sustainability, engaged in a discussion around ecological, economic and social challenges that the digital world poses from a global perspective, and involved participatory activities, this final Unit 4 has a clear focus on questions about the future. The focus is *on raising ideas, questions, concepts*, etc. oriented towards existing theories on developments in the IT sector. Participants are confronted with the following questions: In which future do you want to live in, considering ‘the needs of the present without compromising the ability of future generations to meet their own needs’ (United Nations, 1987)? This discussion *must* be collaborative, interdisciplinary and open-ended. In this way, the ability to converse and argue is encouraged. The theme is designed in such a way that a discussion can only take place with the inclusion of interdisciplinary research results. This pedagogical format also addresses the discussion on future literacies (UNESCO).

Pedagogical Approach

Unit 4 starts with a video that introduces current issues in the field of digital developments. Terms explained in this video include robotics, artificial intelligence and digital capitalism. The video refers to issues of social, environmental and economic sustainability. In addition, further sources are provided. In a future workshop (‘Zukunftswerkstatt’), the participants are encouraged to sketch possible future developments of one or more trends discussed in the video in teams. The aim is not to draw future scenarios that are as realistic as possible. It is about imagining a version of the future that is as dystopian or utopian as possible, as well as discussing the question of whether or not such a future will come to pass. At the end of the unit the groups present their ideas of a future to each other. As a conclusion, a joint statement is drafted and published summarizing these actions.

A Future with or without technology? Importance of the theme

New technological developments have always challenged society. This is also the case with digital technologies. New developments such as robotics and artificial intelligence in particular pose key questions in terms of sustainable development: Who and what is the human being? Who decides on ethical principles? How do we want to live with digital technologies today and what ethical principles do we need to establish today for tomorrow? - And what impact do these decisions have on our ecological, economic and social livelihood? Numerous international experts are working on these questions. The questions are by no means easy to answer. The focus of this Unit 4 is therefore initially on understanding the diverse challenges in terms of the sustainable development of digital technologies for the future. These questions are then discussed and worked on together with the students as part of a future workshop.

Piloting of the materials within TAP-TS

The concept of the future workshop (‘Zukunftswerkstatt’) has already been trialed several times in university teaching. The materials in this Unit 4 were piloted as part of an Active Learning Event (ALE) with pre-service teachers and in-service teachers. The materials are arranged [in a Moodle course](#) on the TAP-TS Platform.



UNIT Overview

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for assessment
Knowledge about future developments in the IT sector and ideas for a more sustainable development	Pre- and Inservice-Teachers for students (6-10y)	195 min.	<ul style="list-style-type: none"> - (digital) media education - Informatics - Ethics - Politics 	<p>Activity 1. Introductory video – A Future with or without Technology?</p> <p>Activity 2. A Future with or without Technology?</p> <p>Activity 3: OUR RESOLUTION</p> <p>Activity 4: FINAL RESOLUTION</p> <p>Activity 5. Reflection on teacher practice</p>	Workshop-Documentation and Reflection Discussion Co-Creation (written statement)
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Define current concepts on developments in the IT sector and enter not a discussion about them. ✓ Work with others on future concepts and outline developments. ✓ Define and argue measures for a more sustainable development in the IT sector. 				
Prior Competencies	obligatory: Unit 1, 2 and 3 from LTP 2				
Required materials	<ul style="list-style-type: none"> • Pen and paper • Laptop / Smartphone / Laptop • Booklet: A Future with or without Technology? 				
Cooperation/ Networking	For more insight, it is worth cooperating with museums on digitality and art (in Austria e.g. Ars Electronica Center, https://ars.electronica.art/news/de/) or with non-university and extracurricular partners with a focus on global learning and digitality.				
Practical Notes for Teachers	Some materials, vidoes, interactive boards are located on the TAP-TS platform, in a Moodle Course. Make sure that you log in first to be able to access those - https://tap-ts.eu/course/view.php?id=12				
Addressing GreenComp	Embodying sustainability values				
	X	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
	X	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
		1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
x	2.1 Systems thinking	To approach a sustainability problem from all sides; to consider time, space and context in order to understand how elements interact within and between systems.			
x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.			



	x	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
Envisioning sustainable futures			
	x	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
		3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	x	3.3 Exploratory thinking	To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.
Acting for sustainability			
	x	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	x	4.2 Collective action	To act for change in collaboration with others.
	x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.



UNIT DESCRIPTION

Start-Up

The aim of the start-up activity is to introduce different perspectives on future issues. The students should gain an insight into the topic of future issues and develop initial ideas for a possible future.

**Estimated
Duration**



Activity 1.
**Introductory video – A
Future with or without
Technology?**

The video shows different perspectives of scientists on the question of the future. The glossary will sum up all important terms.

Preparation for Activities: Organize your classroom for a group work. Ideally, each group would have access to a computer or tablet.

A Note for a Teacher: We propose a video produced within the TAP-TS project on the platform (please, make sure you are logged-in). There are many more materials (Open Educational Resources) such as videos on the internet. If you want to use them, make sure that their quality is proofed.

Description

1.  Give the students time to watch the [Video: A Future with or without Technology?](#)
2.  The students should enter all important terms and concepts [in the glossary.](#)

45 min



Development

In order to approach the question of the future, it is necessary to adopt different perspectives and develop various approaches to solving different problems. The method chosen for this is a future workshop (Zukunftswerkstatt). In a future workshop, students are encouraged to sketch possible future developments of one or more trends discussed in the video. The aim is not to draw future scenarios that are as realistic as possible. It is about imagining a version of the future that is as dystopian or utopian as possible, as well as discussing the question of whether such a future will occur or not. What measures need to be taken to enable or prevent such a future. The future workshop can be held both in an online format and in person.

**Estimated
Duration**

Activity 2. A Future with or without Technology?

The Booklet 1.1 “A Future with or without technology” guides students and teachers through the entire “future workshop” (‘Zukunftswerkstatt’).




GreenComp: 1.1 Valuing Sustainability; 2.1. Systems thinking; 2.2 Critical thinking; 2.3 Problem

Preparation for Activities: Organize your classroom for a group work. Ideally, each group would have access to a computer or tablet.

A Note for a Teacher: It is advisable to print out the complete booklet (in Handouts) in advance or make it available online. And to prepare colored pencils for all participants.





115 min

Description





1.  Hand out the booklet [A Future with or without Technology?](#) to the students. Follow the steps described in it.
2.  Step 1: Build a team. Let the students get together in groups of 3-4 people. Then ask the students to complete the BUILD A TEAM worksheet together.
3.  Step 2: Show the students the materials Step 2: Collect Impressions for the COLLECT IMPRESSIONS worksheet: Take another look at Units 1 to 3. What content surprised you the most? Which arguments do you find particularly important? Make notes in the booklet in Step 2 and try to write down the main arguments.





*framing; 3.3 Futures
Literacy*

4.  Step 3: Let the students create a joint mind map on the CREATE A MINDMAP worksheet. This should deal with the question of current or future problems. In the booklet version, the worksheet for the mind map is removable.
5.  Step 4: In the next step, the students should classify and organize the results of their mind map. To do this, the students should create a legend on the CLASSIFY AND ORGANIZE worksheet. At the end, the students have to decide on a problem that they want to try to solve.
6.  Step 5: The next task for the students is to find and develop solutions to the problem they are looking for. There should be no limits to the students' creativity. The students should then subject the solutions to a reality check. Which proposed solution could really be implemented in reality?
7.  Step 6: In this step, the students should make notes for their conclusion. They should write down all the arguments and proposed solutions that they have previously worked out. At the end, the students can then mark which solutions and arguments make it into their resolution.

Consolidation

		Estimated Duration
<p><i>The aim of this activity is for the groups to share their results in plenary. To do this, each group should present the problem to be solved, the proposed solutions and the respective arguments.</i></p>		
<p>Activity 3: OUR RESOLUTION</p> <p>The aim is to bring all ideas together and find the main aspects for future development.</p> <p><i>GreenComp: 1.1 Valuing Sustainability; 2.1. Systems thinking; 2.2 Critical thinking; 2.3 Problem framing; 3.3 Futures Literacy</i></p>	<p>Preparation for Activities: Prepare a writing facility (Etherpad) where shared notes can be collected.</p> <p>A Note for a Teacher: Make sure, that you have enough time as the discussions can be very intensive and cannot exactly be calculated in advance.</p>	15 min
	<p>Description</p> <ol style="list-style-type: none">  The students write their completed resolution on the Step 7: OUR RESOLUTION worksheet. Finally, each group signs their resolution.  Let the groups present their ideas on how they imagine their future.  Note commonalities and differences together with the students in the Etherpad Step 7: Commonalities and differences.  Are there commonalities in the measures needed to prevent dystopian futures? Are there commonalities in the measures needed for a better future in a digitally connected world? 	


Follow-Up		Estimated Duration
<p><i>The aim of this activity is to bring all the results together. Finally, a large poster with all the resolutions will be produced.</i></p>		
<p>Activity 4: FINAL RESOLUTION Finally, all the ideas developed in Unit 4 will be summarized as a shared Resolution, with all the main messages. This also will be the finish of the entire LTP.</p>	<p>Preparation for Activities: Prepare a free space on the wall or on the floor.</p> <p>A Note for a Teacher: Be proud of the participants. They made it through the future workshop and came to a finish. That was hard work.</p> <p>Description</p> <ol style="list-style-type: none"> 1. Step 8: The teams should cut their resolution out of the booklet. 2.  Finally, all teams attach their resolution to the poster: OUR RESOLUTION FOR OUR FUTURE . 3.  You can collect all the teams' resolutions on a digital pinboard . 	<p>20 min</p>

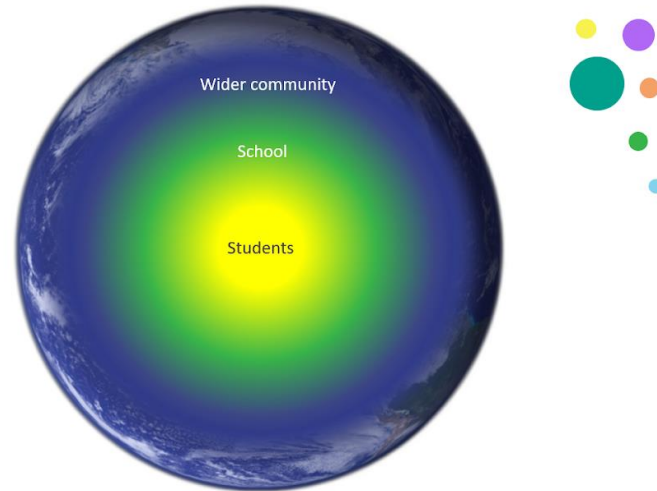


Activity 5. Reflection on teacher practice

This is an activity aimed at helping reflection (individually and/or with colleagues) on how the previous activities contribute to developing sustainability competences and acting in a more sustainable way.

How can I mobilize the activities in my teacher practice?


 Please reflect on two or three of the following dimensions at three levels of engagement (students - teacher; school; and wider community and beyond):



Dimension 1. Learning objectives:


- In what ways do these activities contribute to the global educational goals for your students? You might consider in particular LTP methods, materials, tools and activities you would or have implemented/transferred from the TAP-TS LTP into your regular teaching curricula.
- Within the school or learning context, how have the activities helped the learners in terms of embodying sustainability values, acting for a sustainable future and/or envisioning a more sustainable future?





 How have the activities added to the knowledge and understanding of the learners in terms of working with others in the broader community to create inclusive visions for a more sustainable future?



Dimension 2. Integration with different subjects:


 In what ways the activities could engage your students with different knowledge areas and subjects of the curriculum? In what ways these activities could be connected with different subjects of the curriculum?


 How have the activities contributed to collaboration with others at school or institutional level to approach a sustainability issue from different perspectives, knowledge areas and contexts?
In your opinion, do the LTP materials, tools and methods you have implemented also offer potential for use in other subjects? If so, in which subjects?

 How have the activities encouraged students to draw on different perspectives, and subject knowledge to identify interconnections, and reflect on one's own environmental, cultural and economic impact?



Dimension 3. Inclusion:

 Can the previous activities contribute to all students' participation and learning? What actions can you take to ensure the learning of all students?

 How have the activities contributed to engage with different perspectives to consider sustainability challenges and opportunities?

How do the activities help reflect on, identify, envision or even shape the trajectory towards a collective preferred future that includes various perspectives, cultures, traditions, and are grounded in values for sustainability?



Dimension 4. Environmental / Sustainability awareness:

To what extent do the activities promote awareness and responsibility among your students?

Did the implemented LTP materials, methods or tools increased or rather limited the opportunity to increase students' environmental awareness?

How have the activities encouraged the students to be aware of their individual and collective impact on nature, and provided opportunities to restore it at school level?

How have the activities contributed to grasp connections and interactions between natural events and human actions?



Dimension 5. Digital resources and equipment:

Do the current resources and equipment available in your institution adequately support the activities you have selected and implemented from LTP materials, or are there enhancements needed?

How did you try to enable students to use resources for learning at school in a sustainable way?

Did the activities encourage students to assess and question their needs to carefully manage resources in the pursuit of longer-term goals and common interests? How did the activities help them to think critically about information sources and communication channels on sustainability to assess the quality of the information they provide?



Dimension 6. Community involvement:

- To what extent can you involve the local community or connect with community issues related to the sustainability theme approached?
- Have the selected and implemented LTP methods, tools and materials encouraged you to initiate cooperation with external partners (associations, companies, NGOs, etc.) to enrich learning experiences? If so, in which areas are you aiming for cooperation?
- To what extent do the activities engage in democratic decision making and civic activities for sustainable development?
- How does your teacher practice encourage students' intentions and willingness to give back to the community and nature?



Dimension 7. Assessment and feedback:

- Have you adapted the original assessment methods or the requirements for students after integrating the LTP materials, methods, or tools into your existing teaching concept? If yes, in which way/how?
- To what extent does your teaching practice encourage students to use evidence, combine knowledge and resources to analyse and evaluate futures and their opportunities, limitations and risks, and contribute to decision-making at school level.
- To what extent does your teaching practice encourage students to use evidence, combine knowledge and resources to analyse and evaluate futures and their opportunities, limitations and risks, and contribute to decision-making, and become agents of change.



Glossary of Icons



- Video



- Quiz



- Worksheets



- Editable Worksheets; task to make notes



- Various Media, e.g. Learning Apps



- Text to Read, or present and actively listen to others



- A question to Respond or a Question for Reflection



- A Discussion



- A task for an inquiry or search



- Focusing Activity



- A Reflection Activity



- An Activity for Action



- Suggested answers



- a short note for a teacher



- a group exchange



Glossary of Notions


The collaborative writing of a glossary on the central terms of the LTP 2 is part of the tasks (create an Glossary).



Worksheets and Links

Start-Up

Activity 1 Introductory video – A Future with or without Technology?

- [Video: A Future with or without Technology?](#) 

Development

Activity 2: A Future with or without Technology?

- **Booklet:** [A Future with or without Technology?](#)  (also in handouts)

Follow-up

Activity 4: FINAL RESOLUTION

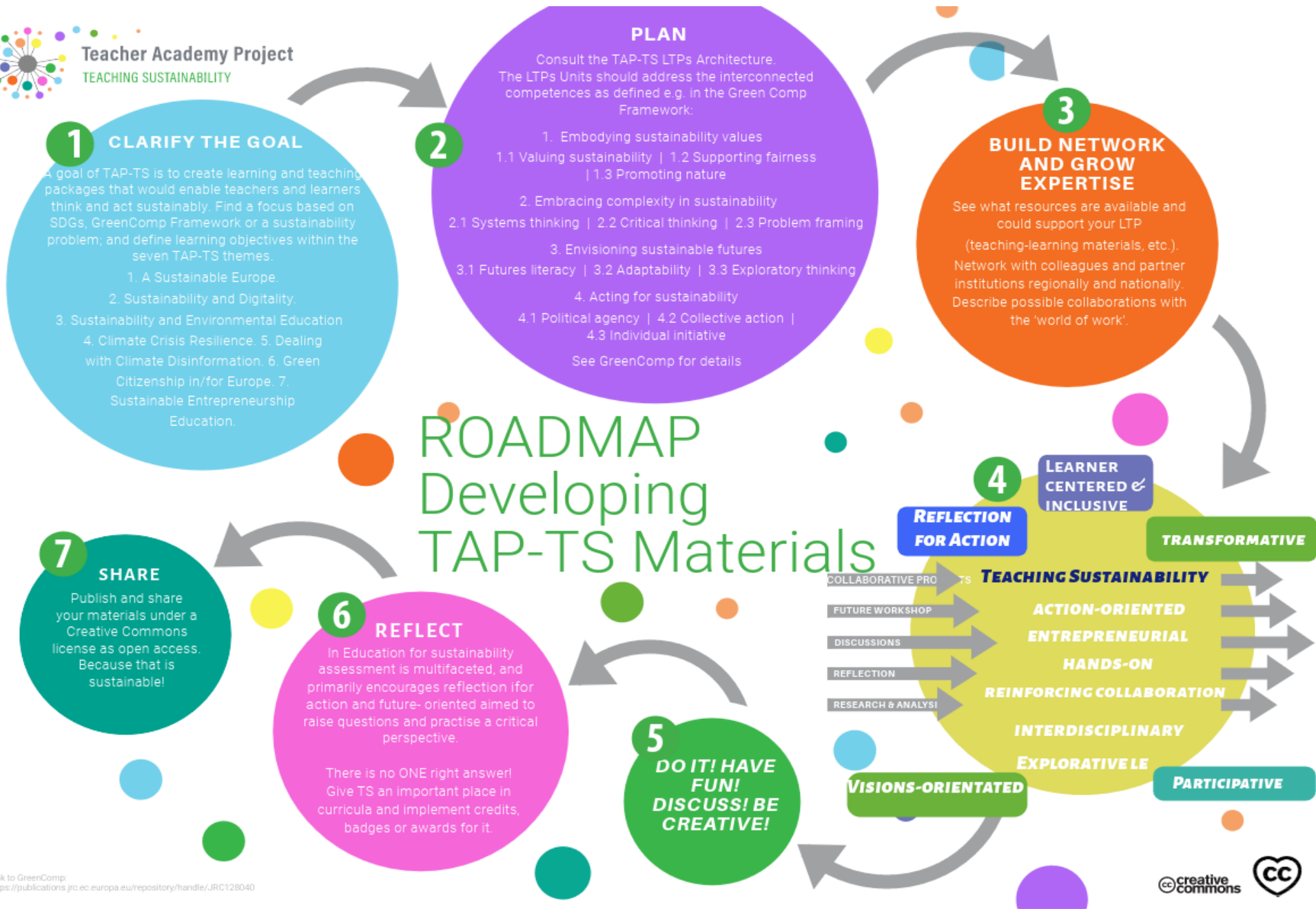
- **Poster:** [OUR RESOLUTION FOR OUR FUTURE](#) 

TAP-TS Roadmap

TAP-TS Roadmap has three main goals: (1) for the TAP-TS partners as a roadmap to design LTPs; (2) for teachers and student teachers to design materials for teaching sustainability; (3) evaluation of LTPs. Explore the visualisation on the next page.

TAP-TS Roadmap: the Steps / stages in the TAP-TS LTPs Design Journey

1: Clarify the Goal	<p>Our overarching goal is to enable learners and teachers to think and act sustainably. To actively participate in the discourse on sustainability, the topics must also be addressed - sustainably - in schools and universities. The goal of TAP-TS is to create learning and teaching packages for this purpose in the following areas:</p> <ul style="list-style-type: none"> 2.1 A Sustainable Europe. 2.2 Sustainability and Digitality. 2.3. Sustainability and Environmental Education. 2.4 Climate Crisis Resilience. 2.5 Dealing with Climate Disinformation. 2.6 Green Citizenship in/for Europe. 2.7 Sustainable Entrepreneurship Education.
2: Competency Areas	<p>The LTPS should be aligned with the interconnected four competences defined in the Green Comp Framework: • Embodying sustainability values • Embracing complexity in sustainability • Envisioning sustainable futures • Acting for sustainability</p>
3: Networking & Bundle Expertise	<p>There are many exciting topics. 1. Find a focus: what driving question is at the centre of your LTP. 2. See what resources are available (competencies, teaching-learning materials, etc.). 3. Network with colleagues and partner institutions regionally and nationally.</p>
4: Working through the design process	<p>Teaching Sustainability should be: action-oriented learning; hands-on; focussing on real life challenges; stimulate creative collaboration between teachers and learners; visions-oriented; participatory and action oriented . Approaches to teaching sustainability may be inquiry-based learning; explorative learning; networked learning; participation learning aimed at problem framing. Teaching Sustainability may incorporate the following activities: collaborative projects, future framing workshops, research and analysis, discussion.</p>
5: ASSESSMENT DESIGN and REFLECTION	<p>In Education for Sustainability assessment can be multifaceted and primarily encourage reflection and be evidence based. There is not always ONE right answer. The goal should be to RAISE QUESTIONS. TS is not about teaching the „right“ behaviour, but about practising a critical perspective. Give TS an important place in curricula and implement credits, badges, or awards for it.</p>
6: PUBLISH TO TAP-TS PLATFORM	<p>Can you and where can you publish your materials under a Creative Commons license as free as possible. Because that is sustainable!</p>





Teaching Sustainability: Learning activity Template

1. Introduce yourself!

My name:
My country:
My role:
My school:
My class:

2. OVERVIEW

Provide a brief description of the learning activity, including information about the targeted age group and duration. Clearly state the motivation behind your learning activity and explain which elements of the curriculum your learning activity is related to.

Age Group:

Duration:

Related Themes of Sustainability:

Description:

3. LEARNING OUTCOMES

What are the learning outcomes of this learning activity, and which key GreenComp competences does it promote?

4. LEARNING APPROACH

Having in mind the learning outcomes, what active learning approaches will be applied?

Specify the engagement strategies and sequence of learning tasks that students will develop in the context of the activity. Explain how GreenComp competences will be promoted.

What will be the role of the teacher, and what will be the students' role? How will the students work—individually or in groups?

5. DIGITAL RESOURCES

Which digital technologies, including tools, services, and resources, will be utilized in the activity? Additionally, how will these digital technologies be effectively integrated to enhance lesson outcomes and student understanding?

6. ASSESSMENT

What assessment strategies and instruments will be employed to evaluate student learning?

GreenComp Framework: the European Sustainability Competence Framework

Within the TAP-TS Project, *GreenComp* (Bianchi et al., 2022) serves the following purposes: design of learning and teaching packages; development of TAP-TS professional development activities, (self)-reflection, and evaluation. The aim of GreenComp is to foster a sustainability mindset by helping teachers and students develop the knowledge, skills and attitudes to think, plan and act with empathy, responsibility, and care for our planet.

Visual representation of *GreenComp*:



GreenComp consists of 12 competences (in bold) organised into the four areas (in italics) below:

<p>- Embodying sustainability values, including the competences</p> <ul style="list-style-type: none"> • valuing sustainability • supporting fairness • promoting nature 	<p>- Envisioning sustainable futures, including the competences</p> <ul style="list-style-type: none"> • futures literacy • adaptability • exploratory thinking
<p>- Embracing complexity in sustainability, including the competences</p> <ul style="list-style-type: none"> • systems thinking • critical thinking • problem framing 	<p>- Acting for sustainability, including the competences</p> <ul style="list-style-type: none"> • political agency • collective action • individual initiative

Reference: Bianchi, G., Pisiotis, U., Cabrera Giraldez, M. [GreenComp – The European sustainability competence framework](#). Bacigalupo, M., Punie, Y. (editors), EUR 30955 EN, Publications Office of the European Union, Luxembourg, 2022; ISBN 978-92-76-46485-3, doi:10.2760/13286, JRC128040.

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