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**How do you solve a problem like MaRIA?
Designing opportunities for Modelling and Reflecting
on Instructional Activity within EU TAP-TS Learning
& Teaching Packages and Learning Events******

Summary

The *Teacher Academy Project on Teaching Sustainability* (TAP-TS) is one of eleven inaugural Erasmus+ Teacher Academies funded to address key educational concerns of the European

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Commission in developing the European Education Area (ERA). These academies foster European partnerships to enhance cooperation among teacher education institutions, curriculum experts, and training providers in order to support teachers and strengthen their continuous professional development across Europe. TAP-TS brings together a unique consortium of European teacher education partners focused on sustainability education, creating innovative teacher-education experiences using high-quality Learning and Teaching Packages (LTPs). Central to these LTPs is a model of professional learning that is “deeply reflective” and “values-led” (Cavadas et al., 2023; Goodwin et al., 2023; Menter & Flores, 2021; Purdy et al., 2023). This paper discusses how the partnership designed and integrated opportunities for systematic and reflective teacher learning into the TAP-TS instructional activities. The paper begins with an overview of TAP-TS and notes the importance of EU *GreenComp* (Bianchi, Pisiotis, & Cabrera, 2022) in its work. It then explores the TAP-TS Design Roadmap – detailing the project’s approach to planning reflective learning experiences through resources, materials, and pedagogies. Next, it describes the TAP-TS *MaRIA* framework, which guides follow-up learning activities within TAP-TS LTPs and project learning events – illustrating how this facilitates engagement levels and reflection in both technical and professional terms. The paper concludes by discussing teacher reflection as an act of professional agency – proposing that this generative reflection extends beyond the classroom and is essential for the deeper teacher learning and professionalism pursued by TAP-TS.

Keywords: reflective professional learning, EU *GreenComp*, EU TAP-TS Teacher Academy

Introduction: Reflection and learning

Teacher reflection has long been recognised as a central and essential—if problematic and often misunderstood—aspect of teacher professional development and learning. This problematic ranges from the challenge of researching the idea empirically (Korthagen, 2010) and the need for reflection to be both *critical* and *dialogical* in terms of the cultivation of equity and social justice (Gorski & Dalton, 2020), to discussions of the deeper nature of reflection for teacher professionalism and its value within collaborative inquiry (for example: Svendsen, 2020; Goodwin, Madalińska-Michalak, & Flores, 2023).

The *Teacher Academy Project on Teaching Sustainability* (TAP-TS) is one of eleven inaugural Erasmus+ Teacher Academies funded to address key educational concerns of the European Commission in developing the European Education Area (ERA). These academies foster European partnerships to enhance cooperation among teacher education institutions, curriculum experts, and training providers, in order to support teachers and strengthen continuous professional development. TAP-TS brings together a unique, interdisciplinary consortium of European teacher education partners focused on sustainability education to design, develop, and disseminate innovative teacher-education experiences built around high-quality Learning and Teaching Packages (LTPs). Central to these LTPs is a model of professional learning that is “deeply reflective” and “values-led” (Cavadas, Branco,

Colaço, & Linhares, 2023; Goodwin et al., 2023; Menter & Flores, 2021; Purdy, Hall, Khanolainen, & Galvin, 2023). We have come to see this approach as generative, dialogical, and essentialising. Placing opportunities for such systematic, reflective teacher learning at the heart of TAP-TS LTPs emphasises the central role of what we envision as *generative reflection* in the TAP-TS vision for teacher professional learning and development.

The professionalising value of purposive reflection is well-articulated by Flores (2023) when she notes the need to move beyond “...a narrow and simplistic view of teaching and of the process of learning to teach” in order to cultivate dispositions, attitudes, and beliefs that are essential to mastering the “sophisticated, contextual and dynamic nature of teaching” (p. 557). Teacher reflection in this view foregrounds the potential that taking a generative approach holds for criticality, agency, and identity: this is a *leitmotif* of TAP-TS LTPs.

Two observations directly relevant to this present paper follow from this. First, within the TAP-TS project *generative reflection* is envisioned as an essential activity for teacher learning in a postdigital world. It enables educators to adapt to technological changes (Guggemos & Seufert, 2021), engage more meaningfully in critical thinking and innovation (Hauerwas, Gomez-Barreto & Fernández, 2023), enhance their professional development through purposive activity (Svendsen, 2020), build resilience and adaptability (Galvin et al., 2023), and encourage collaborative as well as individualised learning (Segal, 2024). But primarily, this premises life-course agency and agentic action (Eteläpelto, Vähäsantanen, Hökkä, & Paloniemi, 2013). By embracing dynamic and continuous generative reflective practices, teachers can more effectively and more confidently navigate the complexities of contemporary education and prompt meaningful improvements in teaching and learning experiences.

Second, the interdisciplinary nature of the TAP-TS project team brought some interesting and rather different perspectives to project conversations on the nature and practicalities of reflecting for learning. This included perspectives and approaches from Human-Computer Interaction (HCI) and visual arts methodologies that were unfamiliar in the teacher education context and its discourse – in particular the notions of generative reflection stages (Jung & Trischler, 2021) and HCI design resources that support reflection (Bentvelzen, Woźniak, Herbes, Stefanidi, & Niess, 2022). Insights from these conversations enabled the LTP architects and writers to embed additional intention and purpose into the project designs – so creating extended opportunities for generative reflection within project learning materials and events. Designing in this richer way resulted in LTPs that better enabled professional learning and critical engagement. Consequently, TAP-TS LTPs incorporating these stages and design resources offer a more continuous, dynamic learning process which prompts learners to engage deeply with their experiences,

insights, and so encourages pedagogical action that fosters growth, teacher agency, and innovative thinking. This helps project participants to cultivate those essential 21st century educational dispositions, attitudes, and beliefs that Flores (2023) references. Of course, reconciling and leveraging the variety of perspectives and interests that partners brought to the work was not always straightforward or without challenges to the project's implementation. The co-authoring of all substantive elements of the project went a considerable distance towards mitigating this, as did the practices of frank and open discussion which came to characterise TAP-TS regular Project Steering Group (PSG) meetings and the ad-hoc planning to do with individual events and LTP development. For instance, all LTPs were co-authored and the resources co-developed by pairs or groups of partners and each project learning event was assembled by more than one partner – most having contributions from across the project consortium in terms of both planning and delivery. From the experience of the project, we would argue that collaboration, co-authoring, and co-design are crucial in multi-partner professional development projects, as they leverage diverse expertise, foster shared ownership, and provide better opportunity for creativity. By integrating the varied perspectives brought by TAP-TS partners, we found that these practices lead to more inclusive and innovative solutions while building better understanding and strengthening relationships among partners. This helped ensure alignment with the project goals, more efficient use of our resources, and contributed in a major way to scalable, sustainable outcomes. Additionally, working in this mode promoted adaptability, broadened the range of outputs, and amplified the project's impact by helping build robust communication, mutual accountability, and strength-centred design. Together, they created a foundation for achieving meaningful, enduring success for our project. A subsequent paper will expand on this and share project learning around the value deliberative co-creation brought to TAP-Ts and similar Erasmus+ Teacher Academies.

The paper is structured as an account of our experiences designing-for and building-in opportunities for systematic, generatively reflective and dialogical teacher learning within TAP-TS project actions and resources. It represents part of the project team's ongoing collective attention to articulating and sharing the learning that emerged through designing, developing, in-context testing, and user validation the TAP-TS LTPs as key project outputs.

The preceding introduction to the background, professionalising intentions, and developmental nature of the TAP-TS project is followed below by detailing of the co-design and co-development methodology the project team adopted, an illustrative discussion of the development and incorporation of what is termed the TAP-TS *MaRIA* framework into post-activity reflection for learning, and a discussion

of the design-learning that we found resulted from pursuing the uniquely generative nature of project materials and activities.

In brief: the discussion below opens with a description of the project's initial planning phase and the emergence of the project's design roadmap, including an exploration of how opportunities for reflection were systematically written-into the activities promoted in the project LTPs. Following this, there is a discussion of the further opportunities for reflection systematically included in TAP-TS learning events and added post-piloting to the concluding/continuation aspects of the LTPs. This is termed the TAP-TS *MaRIA* framework. This discussion addresses how the project tackled the challenge of instantiating occasions for reflecting meaningfully during opportunities provided for Modelling and Reflecting on Instructional Activity – within project learning events and LTPs. In the closing sections of the paper an assessment is offered of the value of the TAP-TS approach – including indications of work remaining to be done and discussions of progress to date set against leads taken from the notions of generative reflection stages (Jung & Trischler, 2021) and what has been achieved in terms of HCI design resources that support reflection (Bentvelzen et al., 2022), as mentioned above.

Defining and building the TAP-TS LTPs – explorations in designing for quality in learning

What is a TAP-TS LTP?

The TAP-TS Learning and Teaching Packages (LTPs) are in essence Learning and Teaching Programmes that include sets of open and flexible learning and teacher materials as well as curated proposals on how these might be used, co-developed and validated by the TAP-TS Partnership. Firstly, the LTPs are planned as formalised modules that can be taken and freely adopted/adapted by teacher education institutions across the EU. Secondly, they include materials and resources for teachers to directly implement in their classrooms, with needed adaptations. The core purpose of the LTPs is to motivate, build confidence, and provide teacher educators, teachers, and student teachers with high-quality materials, ideas, and other practical support on educating for a greener, more sustainable Europe. These materials have formed the foundations for the TAP-TS Academy activity over the life of the project. Importantly, within the TAP-TS activities, learning goes beyond theoretical knowledge acquisition, incorporating practical elements and leveraging participants' personal experiences. Reflection is a key aspect, deepening the learning process and fostering personal development. Thus, in this section, we present the initial design stages of what we call Learning and Teaching Packages (LTPs), and