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Teachers as Drivers of Change?

Recommendations for Future-oriented Teacher Education

teff White Paper

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Introduction

As society evolves at an unprecedented pace and global sustainability crises intensify, the future becomes harder to grasp—feeling distant, uncertain, and difficult to imagine. At the same time, the urgently needed sustainability transformations (IPCC, 2023) require transgenerational thinking, far-reaching responsibility, and transformative agency. This poses major demands for education (UNESCO, 2021), and thereby for teachers and teacher education. The Council of the European Union (2020) highlighted that “(t)eachers and trainers, at all levels and in all types of education and training [...] have a crucial role in preparing individuals of all backgrounds and ages to live, learn and work in the world of today, as well as in creating and leading future changes.”

Thus, it is of utmost importance that teacher education, both pre-service and in-service, are designed to foster agile, efficacious, interdisciplinary, and **future-oriented skills and mindsets** to equip teachers with the tools needed to respond to a time of transformations. This approach is a common thread in all activities and outputs of the Erasmus+ Teacher Academy “Teacher Education for a Future in Flux” (*teff*).

This *teff* White Paper presents recommendations for future-oriented teacher education. By future orientation we refer to education explicitly *about* the future through concepts such as futures thinking and futures literacy (Poli, 2021). This perspective is not focused on the competencies needed in the future but rather highlights the need to **embed a futures thinking approach into current contents and practices of teacher education to equip teachers to engage with uncertainty**. We argue that such an approach, inspired by the field of Futures Studies (see e.g., Börjeson et al., 2006; Miller, 2018), can support teachers in engaging critically with inherited pasts, operating meaningfully in the present, and participating in shaping diverse and more sustainable futures for the school and its role in society and, ultimately, for their students.

Based on the research work undertaken in *teff*, we suggest **four leverage points** by which teacher education should and can be future-oriented: 1) Broadening teachers’ visions of educational futures, 2) Supporting teachers’ projective agency, 3) Integrating futures thinking into initial teacher education and professional development programmes, and 4) Increasing understanding of teachers’ futures thinking. Under each domain are recommendations that are intended for practitioners, policymakers, and researchers in the field of teacher education. The recommendations in this *teff* White Paper address both pre-service and in-service teacher education. The recommendations can be used to develop contextualised solutions in diverse cultural contexts in Europe and beyond.

1. Broadening teachers' visions of educational futures

We can work to build a better future only if we can first imagine it (see e.g., Jones et al., 2012). However, the rapid technological, economic, and social acceleration (Rosa, 2013) limits and clouds long-term futures thinking for everyone, including teachers. Furthermore, current educational discourse in the media and in politics, directs and narrows teachers' imagination about the school of tomorrow (Rahm, 2021). The discourse is driven by socio-political groups whose interest is to restrict the public debate with certain orientations and assumptions (cf. Sääntti et al., 2021). Research on teachers' futures thinking has shown difficulties in imagining alternative futures, especially systemic transformations, and value-based desirable futures (Varpanen et al., 2022; Hyypä et al., 2024; Zhang et al., 2026).

The field of Futures Studies (e.g., Börjeson et al., 2006; Poli, 2021) has developed ways in which futures thinking can be practiced and broadened. Such activities should be implemented in teacher education to enable the questioning of "automatic" thinking patterns and hegemonic narratives of educational futures, thereby expanding the scope of possibilities.

Recommendation 1.1

Facilitate group discussions on different images of the future of education

While everyone thinks about the future in some way, most of us rarely take the time to reflect on our images of the future. In futures education, imagining is an important exercise promoting futures literacy (e.g., Miller, 2018; Poli, 2021). We cannot "know" the future but telling stories of diverse futures prepares us for the world to come and helps us to accept the uncertainty of the future. Engaging in future-oriented imagination is widely seen as inspiring, intellectually stimulating, and curiosity-inducing (e.g., Levrini et al., 2021; Rasa et al., 2022).

Such activities are usually not part of teacher education, although eliciting various images of educational futures could be valuable, e.g., for elaborating and questioning current trends and discourses in education. Research and experiences in *teff* (Zhang et al., 2026, Hyypä et al., 2026a; 2026b) indicate that teachers enjoy and find value in imagining futures of schooling and teachers' profession, especially as a collective activity. Group work of futures imagination typically helps participants see and compare alternatives and connect multiple ideas into a complex whole (Hyypä et al., 2024). Peer discussions on the future can also empower and help participants to understand and respect diversity in personal values and visions and make participants more attached to their personal and collective futures (cf. Levrini et al., 2021; Rasa et al., 2022).

Recommendation 1.2

Practice different techniques of futures thinking

While in everyday life we often talk about "the future" as if there was only one fixed future, futures thinking implies the plurality of futures and involves several types of futures thinking: 'probable futures' (predictive), 'possible/alternative futures' (explorative) and 'preferable futures' (normative) (Börjeson et al., 2006). Research has shown that teachers, as well as students, tend to stick to the first type of thinking, perceiving the future chiefly as an extrapolation of current trends, and not question the prevailing assumptions underlying the 'probable future' (e.g., Hyypä et al., 2024; 2025; Rasa et al., 2024; Varpanen et al., 2022).

To broaden educational horizons, teachers need practice in developing alternative, explorative scenarios by employing the ‘what if’ type of thinking, recognising and amplifying ‘weak signals’, and imagining discontinuities, breakthroughs, paradigm shifts and systemic changes. Moreover, teachers need practice to be able to imagine futures based on their own values, dreams, and choices. This type of thinking (“preferable futures”, or normative scenarios) is needed to activate the projective dimension of agency (Emirbayer & Mische, 1998; Varpanen et al., 2022), the cornerstone of the second domain of recommendations suggested in the following.

Recommendation 1.3

Practice futures thinking within the educational system

Societal futures thinking requires a systemic and holistic consideration of effects and consequences of changes (Hyypä et al., 2024). Future-oriented teacher education must prepare teachers to address the complex societal challenges with no definite solutions. It should profoundly elaborate both the structure and the dynamics of the educational system and its role in society. Research carried out in *teff* shows that in their future visions, although teachers do see the school as a changing system and as a part of a broader societal system, they tend to have only vague images of the teacher’s own role as a key agent in that system (Hyypä et al., 2025; 2026a; Zhang et al., 2026). Also, teachers’ future visions tend to portray a one-way relationship between the educational system and other systems of society, future-oriented teacher education can also be strengthened by a deeper historical-philosophical outlook on the development of the educational system. A critical take on the past, present, and future of education can reveal power dynamics, structural inequalities and ideologies behind both educational institutions and teachers’ own choices.

Curriculum development, the core process of any educational system, is or at least it should be inherently future-oriented work, where teachers are involved. Yet, curricula often evolve slowly (Barth, 2014). Curriculum design should be guided by a forward-looking vision that anticipates different futures, rather than merely consolidating past priorities. When curriculum work embraces this anticipatory stance, it becomes a powerful tool for enabling education systems to remain resilient and relevant.

Recommendation 1.4

Encourage teachers to discuss uncertainties with their students

Educators may think that the uncertainty of the future causes anxiety among their students and, to avoid that, end up presenting the future as more certain than it is, using the rhetoric of imperatives and necessities and downplaying “unrealistic utopias”. However, such an approach closes opportunities by predetermining or colonising the future (Rahm, 2021), and leaves students’ fears and hopes about the future unaddressed. Future-oriented teacher education can help teachers find ways to discuss uncertainties in a positive and empowering way. Research has shown that futures thinking activities are effective in this sense (Levrini et al., 2021, Rasa et al., 2022) – after such activities students have reported seeing the future as more uncertain than before, but that this was a source of inspiration and hope rather than anxiety. The uncertainty of the future paves the way for agency: one can only influence an uncertain future!

2. Supporting teachers' projective agency

Given the key role of education in facilitating the societal transformations needed to respond to the global sustainability crises (UNESCO, 2021), we need teachers who not only adapt but are also willing and capable to be the agents of that change (e.g., Facer, 2011). The capacity to imagine more sustainable futures is a necessary starting point, but it is not enough – teachers also need to be able to critically elaborate, plan a route and act to move towards those scenarios. Future-oriented teacher education needs to build teachers' agency, i.e. the capacity for autonomous social action during which people intentionally transform their social and material worlds (e.g., Biesta & Tedder, 2007).

Futures thinking is a crucial element in an individual's agency (Laherto & Rasa, 2022). How we perceive and relate to the future influences how we act in the present. According to the ecological model of agency (e.g., Emirbayer & Mische, 1998), an individual's capacity for change-making is profoundly dependent on how they perceive their own relationship with the past, present and future, and the projective (future-focused) dimension is crucial in transformative types of agency. However, a teacher's professional agency is usually discussed without long-term visions of school and teachers' profession, both in research and practise of teacher education (Varpanen et al., 2022).

Recommendation 2.1

Disengage from deterministic narratives of education

The public discourse on education tends to highlight certain political narratives, national and economic interests and technological development as the sole drivers of educational reforms. The future of education may seem to be predetermined by such trends and constraints (cf. Rahm, 2021; Sääntti et al., 2021). It is therefore no wonder that research carried out in *teff* has shown limited agency beliefs in local decision-making and teachers' own agency in shaping the future of teaching (Hyypä et al., 2025; 2026a, Zhang et al., 2026). Teachers' narratives of the future are limited by unquestioned assumptions and deterministic narratives of the development of the society and school. Static, deterministic, and powerless images of the future downplay opportunities for teachers' agency. Therefore, future-oriented teacher education should highlight the role of education in societal transformation, teachers' role within educational reforms and teachers' own agency as societal change-makers.

Recommendation 2.2

Use the backcasting exercise with teachers

The backcasting activity is one of the key methods in futures thinking (e.g., Börjesön et al., 2006). Backcasting takes departure from a future envisioned on the basis of one's values, hopes and choices (a 'preferable future'), and maps the route, in the past tense, from that future back to the present. The activity uses guiding questions like "how did we come to this preferable future?", "what actions and steps were needed and by whom?", and "what obstacles had to be overcome during the process?" According to the research carried out in *teff* (Hyypä et al., 2025), the backcasting activity seems to strengthen participants' agency beliefs as a component of teachers' futures consciousness.

It also broadens their imagination of alternative future scenarios, make abstract visions more concrete and actionable, and help bridge the gap between societal contexts and individual agency. Therefore, future-oriented teacher education should complement the preferable future visions by the backcasting activity.

Recommendation 2.3

Discuss values, fears, and dreams with other teachers

The aim of pluralistic education is to bring forward a variety of value-laden viewpoints and discuss them openly (Tryggvason et al., 2023). This is a necessary perspective in future-oriented teacher education. Values underlying the current educational discourses and teachers' own future images should be elicited, elaborated, and also opened to criticism in peer discussions. Value discussions have proven effective in facilitating futures thinking and agentic orientations among students (Hyypä et al., 2024, Levrini et al., 2021; Rasa et al., 2022), and among teachers as noticed during the group reflection at the end of the *teff* futures thinking activity (Hyypä et al., 2026b). As alternative futures and their value bases are rarely discussed explicitly in teacher education, teachers find such collective reflections novel and empowering. By creating a space in which their values, fears and dreams can be fully elaborated and openly discussed, this allows teachers to develop a better understanding of their professional roles, as well as to realise that they are not alone in confronting the uncertainties and possibilities of the future.

Recommendation 2.4

Discuss educational futures in a pluralistic way

Perceptions of the future are deeply personal, cultural, and based on one's worldview. This requires sensitivity about the diversity of futures and viewpoints. Teacher education must recognise that those in power tend to retain control over what counts as a legitimate future and whose time horizons matter. During futures thinking activities, it is important to elaborate on whose future we are actually imagining, who is left behind or at the margins, and what conflicts a future might entail. According to futures studies (e.g., Miller, 2018), futures are shaped not only by trends and probabilities, but also by varying resources and possibilities, memories, cultural narratives, values, and ethical commitments. Future-oriented teacher education cannot be about a singular future but about futures that are plural in many ways: the many futures teachers can imagine for themselves, and the many futures that they wish to simultaneously ensure for the plurality within our societies.

3. Integrating futures thinking into initial teacher education and professional development programmes

The manifold nature of futures thinking and the skills required can be addressed only if teachers at different phases of their career have opportunities to practise and experience futures thinking in a range of settings. Like other transversal skills, developing futures thinking skills is most effective when education provides both dedicated courses or activities and cross-cutting thematic integration across disciplinary boundaries (Lozano et al., 2019).

Due to the complexity and interdisciplinary nature of futures thinking, its implementation in teacher education should be considered in a systemic way. First, it requires breaking down disciplinary boundaries. Teachers should be encouraged to understand futures thinking and future related issues from the perspective of multiple disciplines. Second, the process of implementation should be grounded in the local educational and cultural backgrounds, allowing teachers to connect future-oriented approaches with contextualised practices and societal realities. Moreover, cross-cultural perspectives are diverse while interpreting futures. Teacher education should therefore apply pluralistic thinking, and expand the future scenarios, to avoid the limitation of a single cultural framework.

Recommendation 3.1

Incorporate futures thinking as a cross-cutting theme in teacher education

In an increasing number of European higher education institutions, there is a growing recognition that every academic professional is expected to possess a set of so-called generic skills or transversal competencies. Futures thinking, or anticipatory thinking, has been recognised as one of the transversal competencies, and at the University of Helsinki, it has been incorporated in all study programmes, including teacher education programmes (Pietikäinen et al., 2025). Since futures literacy has the capacity to connect competence frameworks (Laherto et al., 2023), it may serve as a cross-cutting theme that integrates school subjects and the aims of teacher education. Contextualised solutions should be developed in different countries and universities.

Futures scenarios typically address several school subjects. By integrating futures thinking as a cross-cutting theme, teachers are supported to teach the various subjects at the school in a future-oriented manner. Furthermore, the integration makes the futures thinking practices tangible, increasing their relevancy.

Recommendation 3.2

A specific course on Futures Education in teacher education programmes

Given the importance of futures thinking in teachers' professional agency (Varpanen et al., 2022), the related concepts and competencies should be explicitly taught in a specific course in teacher education and teacher professional development programmes. The learning objectives of the course should include, e.g., that after the course the teacher (i) understands the central futures research approaches, concepts, methods, and research results on people's future thinking, (ii) is able to reflect on their own future consciousness and future vision as a

part of the worldview, (iii) understands the connection between futures thinking and agency, and the impact of present choices on the future, (iv) is able to discuss futures and critically and develop different future scenarios, (v) is able to analyse curricula and possible educational trends from the perspective of futures education, and (vi) has gained skills in using various futures education methods in their own teaching.

Recommendation 3.3

Integrate futures thinking into sustainability education

Futures thinking and sustainability education are intrinsically connected because they both encourage learners to anticipate change, critically evaluate present assumptions, and actively engage in imagining and shaping preferred futures that are equitable, resilient, and environmentally responsible (UNESCO, 2021). Anticipatory competence is recognised as a core dimension in most sustainability education frameworks (e.g., UNESCO, 2021; Wiek et al., 2011). Accordingly, the European GreenComp framework (European Commission, 2022) highlights ‘Envisioning sustainable futures’ as one of the four competence areas needed for sustainability education at all educational levels. Furthermore, future-oriented education can address all four competence areas in a holistic and effective way (Laherto et al., 2023). However, research shows that this is not yet being implemented as desired in all institutions (Södervik et al., 2026). Therefore, sustainability education courses or contents in teacher education programmes provide a suitable context for the integration of futures thinking and futures education.

Recommendation 3.4

Promote co-teaching and interdisciplinarity in teacher education

Futures visions inherently integrate multiple disciplines, reflecting the complex and interconnected challenges of the real world. To prepare learners to navigate such complexity, education itself should adopt a similarly interdisciplinary approach. In the context of sustainability education, this is particularly crucial, as addressing sustainability challenges demands both systems thinking and the ability to anticipate long-term consequences (European Commission, 2022). Consequently, interdisciplinary teaching and co-teaching practices should be actively promoted in teacher education. Research has identified several barriers to implementing interdisciplinary approaches in teacher education, including rigid curricula, unclear teacher roles, and the lack of cross-cutting educational materials (Rasmussen, 2016). Effective co-teaching requires clear communication between participating teachers, particularly regarding responsibilities and collaborative goals. By embedding co-teaching into teacher education, programmes can cultivate teachers’ interdisciplinary competencies, strengthen their communication skills, and enhance their flexibility in collaborating with diverse partners (Du & Li, 2025). Such abilities are essential for fostering futures-oriented and sustainability-conscious teaching.

4. Increasing understanding of teachers' futures thinking

While futures literacy is a crucially important capacity for teachers' professional agency, there remains a research gap in understanding this connection (Varpanen et al., 2022; Hyypä et al., 2026a). To support the further development of future-oriented teacher education and research on it, we need to conceptualise teachers' futures thinking further and develop tools for increasing understanding of it. The concepts and tools can be used by teachers themselves for self-assessment, by teacher educators to develop initial teacher education as well as in-service professional development, by policymakers to develop future-oriented policies, and by educational researchers to increase a shared scholarly understanding of the matter. A multi-method approach is needed, rather than the purely qualitative approach that has so far predominated in research literature, or solely numbers-driven quantitative approaches, in order to understand the phenomenon more comprehensively.

Recommendation 4.1

Develop self-assessment tools for futures thinking to support teachers' reflective practices

While people often think about futures, research has shown there to be a lack of metacognitive skills in futures thinking (Levrini et al., 2021). Metacognitive skills can be promoted through reflection, which is the cornerstone of teacher professional development (van Tartwijk et al., 2017). Reflection promotes a critical examination of teaching practices by bridging theory and practice, fostering continuous learning, and enhancing the wellbeing of both teachers and students while supporting improved learning outcomes (Toom et al., 2015). Advancing futures thinking in education also requires practical tools that can strengthen teachers' reflective practices. To support such growth, self-assessment tools are essential: they provide structured opportunities for teachers to reflect on their own futures thinking, identify emerging blind spots, and recognise how their assumptions shape pedagogical choices. Crucially, the tools proposed above serve a dual purpose. They function as reflective mirrors for teachers, offering feedback that supports professional learning, while simultaneously generating rich data for researchers for research-based development of futures thinking in education. Further, self-reflection on the scenarios can help prepare prospective teachers to have procedural knowledge (or deeper understanding) of futures thinking activities and scenarios, so they can also transform their own classrooms into future-oriented learning spaces.

Recommendation 4.2

Address long-term futures thinking in research on teachers' professional agency and adaptive expertise

The development of teachers' professional agency requires a long-term, futures-oriented approach, yet this dimension remains underexplored. While teacher agency has often been examined through the lenses of professional skills, competencies, and identity, incorporating futures thinking is essential for understanding teachers' ownership of change within the profession, and their capacity to effect it (cf. Lutovac & Kaasila, 2014). Futures thinking is a fundamental component of transformative agency (Laherto & Rasa, 2022; Varpanen et al., 2022), enabling teachers to anticipate challenges, envision alternative possibilities, and

strategically engage in professional change. Accordingly, research on teachers' professional agency should be enriched by concepts and methods of the field of Futures Studies (e.g., Börjeson et al., 2006; Poli, 2021).

Strengthening futures thinking is also highly relevant in curriculum and instructional design when viewed through the lens of teachers' adaptive expertise (van Tartwijk et al., 2017). Adaptive experts differ from routine experts in their capacity to respond flexibly and creatively to novel situations, integrate new knowledge, and regulate uncertainty in rapidly changing environments. Futures thinking directly supports this professional adaptability: it cultivates the ability to anticipate alternative trajectories, recognise early signals of change, and make informed pedagogical decisions under conditions of complexity. Embedding futures thinking into research on teachers' expertise and curriculum work therefore strengthens the profession's collective capacity to engage with uncertainty – transforming curricula from static documents into dynamic tools that help teachers and learners thrive in an unpredictable future.

Recommendation 4.3

Develop tools for investigating teachers' futures thinking

To address the research gaps in understanding teachers' futures thinking (see recommendation 4.2), there is a need for analytical frameworks and research instruments. Qualitative methods such as narrative inquiry have proven fruitful in analysing both students' and teachers' writing about the future (e.g., Varpanen et al., 2022; Hyyppä et al., 2024; 2025; 2026a; Levrini et al., 2021; Rasa et al., 2024), allowing a profound understanding of teachers' futures thinking e.g., regarding their professional agency. Such writing assignments not only provide rich research data, but also activities that broaden participants' futures thinking.

In addition to the qualitative approaches, teacher educators and researchers need research-based, validated, and contextualised instruments on teachers' futures thinking. Existing measures, such as the Futures Consciousness scale (Ahvenharju et al., 2018), focus on futures thinking in general rather than that of teachers. Other measures such as the Teacher Professional Agency scale (Vähäsantanen et al., 2019) capture aspects of some professional actions but do not explicitly address futures thinking. *teff* has developed a measurement tool for this purpose, the Teacher Futures Consciousness scale (Zhang et al., 2026). The development of such quantitative research instruments advances research-based development in the field by enabling investigating the impact of interventions with big samples, as well as longitudinal designs to examine how futures thinking skills develop during teacher education programmes. A quantitative approach allows for several types of modelling, enabling us to identify the relationships between factors in a more nuanced way than is possible using qualitative instruments alone.

Conclusion

This White Paper of the Erasmus+ Teacher Academy “Teacher Education for a Future in Flux” (teff) argues that preparing teachers for an uncertain, rapidly changing world requires embedding futures thinking at the core of teacher education. By broadening teachers’ visions of possible and desirable educational futures, strengthening their projective agency, and systematically integrating futures thinking into both initial and continuing professional development, teacher education can empower teachers as active agents of societal transformation. The White Paper highlights the need and presents recommendations for interdisciplinary and pluralistic approaches, inspired by the field of futures studies. Finally, it calls for deeper research and the development of conceptual and practical tools to better understand and support teachers’ futures thinking, ensuring that teacher education remains responsive, adaptive, and oriented towards more just and sustainable futures.

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