WP 3.1 Report

REPORT

Emergence of AI in teacher education - an analysis of the contextualisation of the *TE-REG Manifesto* in the Portuguese educational context

Authors:

Ana Cristina Madeira

Maria da Glória Paula

Violante Romão

Institution: Centro de Formação Dr Rui Grácio/Agrupamento de Escolas Júlio Dantas, Lagos, Portugal

ABSTRACT

This report was prepared within the scope of the European ERASMUS+ project "Teacher Education Regenerated (TE_REG). Beyond Competencies. Rethinking and redesigning teacher education curricula in the GenAI era" - Reference no. KA220-HED-CF9D94FC - and aims to contribute to the analysis of the emergence of (Gen)AI in teacher education, taking into account the demands of a society undergoing rapid social, cultural and technological transformation.

We start from the contextualisation of the TE-REG MANIFESTO "**Teacher Education Regenerated (TE_REG): an integrated view on Teacher Education in the (Gen) AI Era**", with a discussion carried out at all levels of education, integrating several dimensions of analysis at the local level (Continuing Teacher Education, CFAE Rui Grácio), at the regional level (Initial Teacher Education, ESEC - University of the Algarve) and at the national level (*STudIE*, a community of education researchers at the Institute of Education of the University of Lisbon).

The study was therefore based on the contributions of three focus groups held with teacher trainers and practising teachers, university lecturers and initial teacher education students, and education researchers. Participants analysed and discussed the *Manifesto* and reflected on its suitability for the current demands of the teaching profession and the educational context in Portugal. The discussions emphasised the relevance of a holistic approach that articulates digital literacy, ethics, regenerative pedagogical practices and applied research, but also pointed to structural, training and social constraints that require coordinated and contextualised responses, based on new conceptions and practices of teacher education.

1. INTRODUCTION

The Centro de Formação Dr. Rui Grácio (Teacher Training Centre in Lagos, Portugal) is part of the European team of the ERASMUS+ project "Teacher Education Regenerated (TE_REG) Beyond Competencies. Rethinking and redesigning teacher education curricula in the GenAI era" - Reference no. KA220-HED-CF9D94FC.

Within the framework of this European partnership, we promoted the analysis and discussion of the **TE-REG MANIFESTO** "Teacher Education Regenerated (TE_REG): an integrated view on Teacher Education in the (Gen) AI Era" in partner institutions, in order to understand how the principles and proposals of this guiding document are reflected in initial and continuing teacher education, and consequently in teaching and learning, towards a new role for the teacher.

In the current context, in a complex, globalised society marked by social transformations and technological advances, it is essential to understand to what extent the emergence of AI has implications for the performance profile of teachers in Portugal, and whether the relevant frameworks are adequate to the demands of teaching today.

With a view to contributing to the analysis of the implications of this complexity in prospecting a new role for the teacher, consistent with current times, the research objectives set out below were defined.

Study objectives

1. To analyse the results of the contextualisation and discussion of the *Manifesto* within the field of teacher education in educational territories associated with CFAE Rui Grácio in Portugal;

2. To anticipate the challenges facing initial and continuing teacher education in the context of social transformations and the widespread use of (Gen)AI in education;

3. To contribute to the discussion on what it means *to Be a Teacher* in the context of (Gen)AI in society and education.

Strategy

Three focus groups were organised to contribute to the analysis and discussion of the *Manifesto*, taking into account the current educational context and the frameworks for the exercise of the teaching profession in Portugal. The aim was to discuss its effects on teacher education, linking the discussion to the impacts of current social transformations on education in several domains considered structuring for understanding the current challenges of the teaching profession: teacher identity and professionalism, models of initial and continuing teacher education, educational policies and their effects on professional autonomy, social and technological transformations associated with the emergence of (Gen)AI, and the ethical, pedagogical and organisational implications of its integration in schools.

Report structure

The report is divided into five parts: a first introductory part that contextualises the report; a second part in which the main axes of the *Manifesto* are identified; a third part in which the methodology used in the contextualisation and discussion of the *Manifesto* is described; a fourth part in which the study results and the impacts of the Manifesto discussion in various dimensions are analysed; and a final part in which the conclusions of the discussion are presented, considering the challenges for initial and continuing teacher education in light of the *Manifesto* and contributing to a renewed discussion on what it means to "Be a Teacher". Finally, the report highlights a set of recommendations for future coordinated action, envisaging possible frameworks and innovative proposals in the conceptions and practices of continuing teacher education in the context of AI.

2. THE MANIFESTO TEACHER EDUCATION REGENERATED TE_REG AN INTEGRATED VIEW ON TEACHER EDUCATION IN THE GEN AI ERA

2.1. Summary of the Manifesto

The *Manifesto* is based on collaborative creation with six European institutions for initial and continuing teacher education under UNESCO, within the Erasmus+ Project "Teacher Education Regenerated (TE_REG) Beyond Competencies - Rethink and redesigning Teacher Education Curricula in the (Gen) AI era", whose characterisation is available on the website: https://te-reg.eu/

The emergence of Generative Artificial Intelligence (Gen)AI is profoundly transforming ways of teaching and learning, altering the epistemological, social and professional conditions of education. In this context, initial and continuing teacher education faces a dual challenge: on the one hand, the need to overcome practices based on rigid patterns, often reduced to fragmented indicators and procedures; on the other, the urgency to critically integrate the potential of AI while preserving the centrality of the human being in the educational process.

The *Manifesto* emerges as a European guiding document that proposes an integrated, holistic and forward-looking vision of teacher education. It defends principles of quality education, the valuing of dispositions for teaching rather than mere emphasis on fragmented competencies, and a regenerative horizon that articulates technological innovation, ethics, inclusion and sustainability.

The *Manifesto* is not just a document: it is the culmination of a long collaborative journey and sets out a clear path. It was born from an in-depth analysis of the literature, discussions in dynamic groups and dialogues with experts and interested partners from the five countries involved in the project. From this work, the *Manifesto*:

- Reflects common perceptions and expectations for truly quality education.
- Outlines how regenerative teacher education can be a device for innovation, inspiring and empowering educators.
- Ends with a clear call to action, encouraging the participation of all, response and active collaboration.

2.2. The strategy for discussing the Manifesto

In the Portuguese local context, within the educational communities close to CFAE Rui Grácio, the discussion of the *Manifesto* proved particularly pertinent in view of teachers' insufficient AI literacy and the growing demand to adapt pedagogical practices to technological transformations, which will imply other curricular priorities and different ways of thinking about student assessment. Thus, it became imperative to open spaces for reflection, debate and co-creation among different educational actors: teacher trainers (initial and continuing education), school management, middle leadership, pedagogical teams, in-service teachers and student teachers in supervised teaching practice, in order to contextualise the *Manifesto* and attempt to adapt its principles and strategic vision to the specificities of the national education system.

Participants were asked to read the document in advance so as to:

- Become familiar with the fundamental principles and dispositions of the *Manifesto*;
- Discuss its relevance to the national educational reality;
- Assess its applicability in the local educational context;
- Co-create contributions for internal frameworks guiding teaching practices for the ethical and pedagogical use of AI.

The discussion sessions were conducted innovatively, in a training format envisaged as *reflection-in-action*, aiming to promote critical AI literacy within the educational community, mobilise

reflection on regenerative practices in teacher education and foster a collective and situated appropriation of a European document - the *TE-REG Manifesto* - which may guide, inspire and transform professional development for teachers.

3. METHODOLOGY

The study used a qualitative methodology based on three focus groups with different participants, aiming to promote the analysis and discussion of the *Manifesto* and gather perspectives from different actors involved in initial and continuing teacher education. This approach allowed an in-depth analysis of the *Manifesto*'s suitability to the Portuguese educational context and to the *Teacher Professional Performance Profiles*, through active listening to experiences and opinions of professionals in direct contact with the educational reality.

Various digital resources (*Google Workspace, Microsoft Office, Padlet, Mentimeter, Zoom*) and AI tools (*DeepL, NotebookLM, Copilot, Perplexity*) were used to support the processing of qualitative data.

3.1. Framing of the methodological strategy

The adopted methodology sought to enrich the analysis of the *Manifesto* with empirical data collected directly from active participants in the educational context. The focus group technique was chosen for its capacity to promote discussion and the collective construction of knowledge.

3.2. Composition and profile of participants

3.2.1. Focus Group 1 - Context of continuing teacher education, included eleven participants from CFAE Rui Grácio and its associated schools:

- 4 teacher trainers in continuing education, in the areas of Curriculum Development, Citizenship, ICT/AI and Inclusion;
- 1 Head of Curriculum Department;
- 1 Representative of the CFAE Rui Grácio Pedagogical Committee;
- 1 Teacher Evaluator (Internal/External);
- 4 teachers from various education cycles (2nd and 3rd cycles of Basic Education and Secondary Education).

The discussion was substantiated in the context of CFAE Rui Grácio through the organisation of a Short Duration Training Action, lasting three hours, justified as a first structured moment of dissemination, appropriation and adaptation of the *Manifesto* to the Portuguese educational context.
The diversity of participants made it possible to gather a multiplicity of perspectives on the *Manifesto*, enriching the reflection with contributions from pedagogical practice and continuing teacher education.

3.2.2. Focus Group 2 - Context of initial teacher education - ESEC - included 10 participants from the School of Education and Communication of the University of the Algarve:
- 2 university lecturers (initial teacher education);
- 1 Coordinating Professor and Director of the Departmental Area for the Training of Educators and Teachers, ESEC UAlg;
- 1 Coordinating Professor/Director of the Master's Courses in Teaching and Member of the ESEC Scientific Council;
- 1 Director of continuing teacher education;
- 5 Master's students, future teachers.

The diversity of participants made it possible to gather a multiplicity of perspectives on the *Manifesto*, enriching the reflection with contributions from pedagogical practice in the university context of initial teacher education.

3.2.3. Focus Group 3 - *STudIE* context - included 10 members of the research community at the Institute of Education of the University of Lisbon:

- 5 PhD holders
- 5 PhD students

The diversity of participants made it possible to gather a multiplicity of perspectives on the *Manifesto*, enriching the reflection with contributions from a community of education researchers from Portugal, Spain and Brazil, which make up the *STudIE* group, coordinated by Maria João Mogarro, Associate Professor at the Institute of Education of the University of Lisbon.

3.3. Focus group methodology

3.3.1. Focus Group 1 - CFAE Rui Grácio

The discussion session took place in person at Júlio Dantas Secondary School on 6 November 2025, between 18:30 and 21:30, lasting three hours. The *Manifesto* was sent to participants in advance and the session was structured as described below.

3.3.2. Session methodology Focus Group 1

- **Dialogued presentation:**
- Brief introductory presentations of the *Manifesto* and its key axes.
- Contextualisation of AI in Portuguese education.

Link to the presentation in English:
https://docs.google.com/presentation/d/1Dotxh5tFT8obLGUjp_eahFuSXeY84FEc/edit?usp=sharing&ouid=108785622490867152682&rtpof=true&sd=true

- **Individual reflection:**
- Recording of keywords, strong ideas and difficulties in applying the *Manifesto* in the Portuguese context. The digital tool *Mentimeter* was used for an initial brainstorming, which can be consulted at:
https://www.mentimeter.com/app/presentation/alrnnh7gfphhiy79jeta4idtf6j13zrk/edit?source=share-modal
- Identification of personal/professional challenges.
The digital tool *Padlet* was used, the content of which can be consulted at: Discussion of the *Manifesto* for the development of an Internal Framework in AI.
https://padlet.com/violanteroma68/discuss-o-do-manifesto-para-elabora-o-de-um-referencial-inte-jnpuww2zc5ohce7q

- **Collaborative work in thematic pairs:**

- Guided discussion on the axes of the *Manifesto*.
- Production of summaries.
The digital tool *Padlet* was used, the content of which can be consulted at: Discussion of the *Manifesto* for the development of an Internal Framework in AI.
https://padlet.com/violanteroma68/discuss-o-do-manifesto-para-elabora-o-de-um-referencial-inte-jnpuww2zc5ohce7q

- Division of the large group into 5 pairs, each with one axis of the *Manifesto*:
1. Quality education in the AI era – what are the most relevant impacts of this axis in Portugal?
2. Teaching dispositions – which are already present in practice and which need further development?
3. AI literacy and ethics – how to promote teacher and student AI literacy?
4. Regenerative education – how can CFAE Rui Grácio integrate regenerative practices in schools?
5. Call to action – which alliances and forms of collaboration are priorities in our schools in this context?
- **Plenary debate**
  - Presentation of the groups' conclusions.
  - Guided debate with leading questions.
- **Collective co-creation**
  - Consolidation of ideas for an Internal Framework.
  - Individual commitment: each participant takes one idea to their school.
- **Participatory evaluation**
  - Final reflection in plenary.

3.3.3. Focus Group 2 - ESEC - University of the Algarve

The Focus Group 2 session took place online via Zoom on 7 January 2026 and lasted approximately two hours. The script was sent to participants in advance and the session followed the same methodology as Focus Group 1. The session recording was transcribed and analysed, allowing the contributions to be systematised by domains of impact.

3.3.4. Session methodology Focus Group 2

- **Dialogued presentation:**
  - Brief introductory presentations of the *Manifesto* and its key axes.
  - Contextualisation of AI in Portuguese education.
- **Individual reflection:**
  - Recording of keywords, strong ideas and difficulties in applying the *Manifesto* in the Portuguese context. The digital tool *Padlet* was used for the records, which can be consulted at:

https://padlet.com/violanteroma68/discuss-o-do-manifesto-para-elabora-o-de-um-referencial-ine-n
u4lw68s22tz23wk

  - Identification of personal/professional challenges. The digital tool *Padlet* was used for the records, which can be consulted at:

https://padlet.com/violanteroma68/discuss-o-do-manifesto-para-elabora-o-de-um-referencial-inte-n
u4lw68s22tz23wk

- **Collaborative work in thematic pairs:**
  - Guided discussion on the axes of the *Manifesto*.
  - Production of summaries. The digital tool *Padlet* was used for the records, which can be consulted at:

https://padlet.com/violanteroma68/discuss-o-do-manifesto-para-elabora-o-de-um-referencial-inte-n
u4lw68s22tz23wk

  - Division of the group into 5 pairs for analysis and reflection, each with one axis of the *Manifesto*:
1. Quality education in the AI era – what are the most relevant impacts of this axis in Portugal?
2. Teaching dispositions – which are already present in practice and which need further development?

3. AI literacy and ethics – how to promote teacher and student AI literacy?
4. How can ESEC integrate regenerative practices into the initial teacher education curriculum?
5. Consolidation of ideas for an internal ESEC framework - synthesis of strong ideas.

- **Plenary debate**
  - Presentation of the groups' conclusions.
  - Guided debate with leading questions.
- **Collective co-creation**
  - Consolidation of ideas for an Internal Framework.
  - Individual commitment: each participant takes one idea to their institution.
- **Participatory evaluation**
  - Final reflection in plenary.

3.3.5. Focus Group 3 - *STudIE* - Research Community

The Focus Group 3 session took place online via Zoom on 15 December 2025, lasting around two hours. The session objectives were sent to participants in advance. The session recording was transcribed and analysed, allowing the contributions to be systematised by domains of impact.

Session methodology Focus Group 3

The discussion addressed 4 objectives:
- To comment on the principles and fundamental dispositions of the *Manifesto*;
- To assess its relevance to the national educational context;
- To evaluate its applicability in Portugal in both initial and continuing teacher education;
- To envisage contributions towards a framework to guide teaching practice in the AI Era.

The session recording was transcribed and analysed, allowing the contributions to be systematised by domains of impact.

4. RESULTS OF THE FOCUS GROUPS

The results of the three focus groups, which discussed the current relevance and suitability of the *Manifesto* to the Portuguese educational context, were analysed.

4.1. Results of Focus Group 1

4.1.1. Ideas considered innovative in the Manifesto

Participants converged in advocating quality education supported by a holistic vision, where the balance between human knowledge and technology assumes a central role. They valued digital literacy and critical interaction between people and machines, recognising that knowledge acquisition is influenced by values and contexts. They also highlighted the importance of sustained professional effort, combining individual responsibility with collective commitment. In a more dynamic and "intelligent" school environment, new pedagogical possibilities would open up, capable of promoting more meaningful, engaging learning tasks aligned with emerging challenges.

"Quality education"; Participant A.
"A holistic view of teaching methods. The balance between knowledge, man and machine is fundamental and debatable". Participant B.
"Literacy in technologies within the classroom". Participant C.
"AI in a quantum school environment". Participant D.
"Sustained professional effort: emphasise both individual responsibility and shared commitment". Participant E.
"Human-machine interaction". Participant F.
"There are interests at play in knowledge (in the acquisition of knowledge)". Participant G.

"Opening up new possibilities to improve the quality of teaching, inviting them to design more meaningful and engaging learning tasks". Participant H.

4.1.2. Ideas difficult to implement in the local Portuguese context

Participants identified as the main challenge the implementation of a future-oriented education, hindered by inequalities in access to and responsible use of technology. They highlighted the complexity of preparing teachers for unpredictability, for the rapid evolution of artificial intelligence and for the ethical demands associated with its use. They also emphasised that learning depends on students' effective engagement and that society faces difficulties in developing AI literacy in time to keep pace with technological change.

"Education for the future". Participant A.
"Inclusion is quite difficult to put into practice in a society where there is a large difference between students with uncontrolled access to the internet and students educated (especially at home) for its sustainable use". Participant C.
"Preparing teachers for unpredictability/uncertainty". Participant C.
"Learning requires deep engagement and effort from the student; without this commitment and effort there is no learning, and no one can learn on behalf of another". Participant E.
"Difficulty in training society in AI Literacy in a short time and keeping up with the technological revolution at the same time". Participant E.
"Use in an ethical, sustainable and human-centred way". Participant D.
"Knowing how to act, currently, assertively, on ethical issues regarding the use of AI. The teacher is in an experimental/adaptive period. Such situationalism proves complex and a challenge". Participant B.
"Teacher preparation". Participant H.

4.1.3. Summary of the pair work

Pair 1: Quality Education in the AI Era - Guiding Question: What are the most relevant impacts of this axis in Portugal?

Generative AI integrates the educational context, promoting the expansion of new possibilities and raising new challenges, involving students and teachers in continuous collaboration. Participants confirmed that the impact of AI depends on a quality education system and a holistic approach to the curriculum.

"(...) GenAI integrates the educational context and promotes the expansion of new possibilities in the quality of teaching and learning and raises new challenges throughout the learning process, involving students and teachers in a fruitful and continuous collaboration. The conception that democratic societies depend on a quality education system, and that advocates a curriculum, a holistic approach to the curriculum, is already felt in Portugal". (Contribution from Pair 1).

Pair 2: Teaching Dispositions - Guiding Question: Which are already present in practice and which need to be further developed?

Regarding dispositions, *Collaboration* is active, with strong articulation between disciplinary and interdisciplinary groups, as well as between teachers and students. *Contextualisation and Design* are also present, showing openness to new teaching methods and the continuous creation of teaching materials, including AI-based resources, to promote success and inclusion. In terms of *Action*, available means are mobilised to ensure equity and participation for all students. *Research* is the least developed disposition, conditioned by diverse motivations and still conservative perspectives. Finally, Collaboration with the Machine remains under development.

"Collaboration is active, because there is strong collaboration between disciplinary groups and even interdisciplinary ones, between teachers and student teachers. Regarding the machine, it is still under

development. Then, regarding contextualisation, we also think it is present, because we are always open to new teaching methods. In design, we also think it is present, because we are always creating teaching materials and promoting new teaching methods to promote student success and inclusion. In action, the available means are used to promote equity and encourage the participation of all students. And, lastly, research is what we think still needs to be developed". (Contribution from Pair 2).

Pair 3: AI Literacy and Ethics - Guiding Question: How to promote teacher and student AI literacy?

Participants emphasised that promoting AI literacy requires a strong investment in initial and continuing teacher education, equipping teachers to deal with uncertainty, adapt to new tools and collaborate more effectively. They also identified weaknesses in ethical and curricular competencies necessary for teachers to properly guide students in the responsible use of AI. The digital immaturity of many parents was pointed out as an additional obstacle, making their specific training necessary. Proposed solutions included educating families, encouraging students' autonomous work on ethical issues and strengthening collaboration among all educational agents, underlining the importance of joint action within the training and reflection centre.

"(...) We consider that it was precisely bottom to top, because we think that things always come from above, as orders we have to comply with, and that we are not in a reality that, for us, is immersive and important. And it has to be the other way round: it has to start from the bottom. So, it would have to start with collaborative education among teachers, among students, among parents, among staff, among the whole educational community. Therefore, in the first instance, internally, always with that collaborative force functioning.

How should it then be applied in the future? What we think is that it has to be through action, through learning laboratories. That is what all indicators show, at the level of what other countries are doing. As far as I know, AE Gil Eanes already has projects in this direction, and our school may perhaps also move somewhat in that direction.

Then, in a second instance, it would be to move up — and also to move outwards — to partnerships, to the external community, to the active and living forces of society. It can be at institutional and political level, with the municipality, with the City Council; it can be at the level of private institutions; it can be at the level of recreational associations or artistic groups. And there we will always have that collaborative practice. It is from this perspective that we think real progress can be made in this sense and a concrete practical application." (Contribution from Pair 3)

Pair 4: Regenerative Education - Guiding Question: How can CFAE Rui Grácio integrate regenerative practices in schools?

The group emphasised that the integration of regenerative practices in schools by the CFAE should be based on three complementary lines of action: establishing strategic partnerships with companies linked to digital innovation and sustainability, such as Sinopsis, PT or the Galp Foundation, taking advantage of their investment in education and in areas aligned with the Sustainable Development Goals; strengthening the articulation between school, society and the labour market, in order to prepare students for present and future needs; and, finally, adopting a structured top-down orientation, considered essential to ensure adherence, avoid the dispersion of individual initiatives and overcome the low participation that, according to the group, perpetuates stagnation.

"(...) the CFAE should promote regenerative practices through three main axes: creating partnerships with companies in emerging areas that invest in education and the use of digital technology, including entities such as Sinopsis, PT or the Galp Foundation, especially in domains linked to the SDGs and sustainability; strengthening the connection between school, society and the labour market, preparing students for current and future needs; and adopting a top-down orientation, considered essential to ensure meaningful training. According to the group, without a clear directive from above, participation tends to be reduced". (Contribution from Pair 4).

Pair 5: Call to Action - Guiding Question: Which alliances and forms of collaboration are priorities in our context?

The group argued that the integration of artificial intelligence in education requires, above all, the empowerment of teachers, both in initial teacher education and in continuing professional development. It emphasised the need to promote adaptation and collaboration among all stakeholders, in order to develop digital and ethical literacy among teachers and students in a context marked by uncertainty. Several issues were identified, namely the lack of tools and curricular preparation of teachers to respond to ethical questions related to AI, as well as the digital immaturity of many parents, which constitutes an additional obstacle. As possible solutions, the group suggested the creation of specific training for parents and the encouragement of students' autonomous work, properly guided by teachers and guardians.

"It has to be, above all, through the empowerment of teachers in initial education and in continuing professional development. There must be an incentive for major adaptation and collaboration, among everyone, so that we can promote teacher and student literacy, because we are working with something that is uncertain. So there must always be great collaboration and a joining of forces in this training and reflection centre. And here, in agreement with what my colleague was saying, I also think it is important to highlight some issues in this question of AI literacy and ethics itself, such as whether the teacher currently… does he have the necessary instruments (?), the necessary curriculum to know how to respond to ethical questions, consistent with artificial intelligence itself, and to respond appropriately in the classroom context (?). Does the teacher have these tools? I also think it is important to draw attention to the issue, as my colleague mentioned a moment ago, of a certain immaturity that is quite present among parents, and this is a problem. Therefore, for the student's own education regarding artificial intelligence, a possible solution might be to instruct parents through dedicated training, and finally another possible solution to respond to ethical questions would be for the students themselves to have a kind of autonomous work, being encouraged, of course, by teachers and by the parents themselves." (Contribution from Pair 5).

4.1.4. Conclusions of Focus Group 1

Focus Group 1 revealed a shared awareness of the potential and the challenges inherent in integrating artificial intelligence into the Portuguese educational context. A consensus emerged regarding the need for a holistic, collaborative and ethical approach that articulates teacher training, digital literacy, strategic partnerships and family involvement. At the same time, tensions were evidenced between bottom-up and top-down approaches, as well as concerns related to equity, inclusion and the education system's effective capacity to respond to rapid technological evolution.

4.2. Results of Focus Group 2 - ESEC

4.2.1. View on AI in Education

The debate shows a clear consensus that AI is no longer optional, becoming an unavoidable context in Education, which requires a profound reformulation of teacher education. More than technical mastery of tools, critical literacy stands out as a central competence, ensuring a balance between harnessing AI's potential and preserving the human, ethical and relational dimension of teaching.

4.2.2. Ideas considered innovative in the *Manifesto*

Regenerative teacher education frames teaching as a "collective and collaborative" process (Participant B), proposing the transformation of pedagogical practices through experimentation, reflection, dialogue and collaboration.

The very "idea of regenerative education (and not merely formative)" is an "innovative" concept because it goes beyond incremental improvement; it implies repairing, rebuilding and (re)humanising teacher education". (Participant F).

The redefinition of assessment practices, making them more flexible, "valid, fair, meaningful and future-oriented". (Participant C).

Teacher education should go beyond competencies, considering not only knowledge and know-how, but also dispositions for action, professional sensitivities and the capacity to intervene in practice. When used appropriately and critically, (Gen)AI can open new possibilities for improving the quality of teaching and learning, supporting the creation of more meaningful tasks and distinguishing the roles of teachers and technology.

"Opening up new possibilities for improving the quality of teaching. When used appropriately it can help create tasks that result in more meaningful and engaging learning". (Participant H)
.
The *Manifesto*'s call to action "implies awareness that pedagogical practices, at all levels of education, will have to undergo changes. It is suggested that through experimentation and reflection, dialogue and collaboration, dynamics appropriate to the world we live in are created." (Participant A).

4.2.3. Ideas difficult to implement in the Portuguese local context

Teacher education requires the development of a solid (Gen)AI literacy, understood as "the capacity to understand, use, question and integrate, in a critical, ethical and pedagogical way" the technology, integrating it into teaching and assessment processes. (Participant A).

It is necessary to cultivate in teachers "the disposition to question, reflect and investigate their own practice and assumptions", and to remain open to new perceptions and futures, not in a context of pedagogical supervision but with an investigative nature. (Participant B).

Transforming traditional assessment models, valuing meaningful learning, critical thinking and collaboration requires "new resources, training and adaptation of educational practices". (Participant C).
The need to situate teaching and learning "in broader contexts and ensure equitable access to the potential of (Gen)AI". (Participant D).

"Risk of students (and teachers) becoming dependent on AI, losing critical and creative capacities". (Participant E).

Operationalisation difficulties arising from educational cultures centred on competencies, indicators and results, as well as fragmented practices in higher education, with weak articulation between theory, practice and research and among teachers, in tension with the demand for collaborative work, integrated curricula and shared responsibility - "The Manifesto requires collaborative work among teachers, integrated curricula and shared responsibility; this clashes with highly individualised institutional cultures and constraints of teaching load and time". (Participant F).

4.2.4. Summary of the pair work

Pair 1: Quality Education in the AI Era - Guiding Question: What are the most relevant impacts of this axis in Portugal?

Pair 1 highlighted AI's potential to support teachers in designing more meaningful and challenging tasks, promoting greater student engagement when used intentionally and pedagogically. According to one group member, "these tools, more than giving answers, should be good at creating questions (...) allowing quality to be added to tasks". (Participant B).

AI was also identified as a useful resource for supporting repetitive and routine tasks, freeing time for practices of greater educational value. "The machine does better what is processing information,

doing routine tasks, generating lists, supporting more mechanical tasks and leaving to the teacher what is fundamentally human: critical spirit, judgement, discussion, ethical questions, sensitivity, aesthetics". (Participant A).

Inevitably, the greatest impact of (Gen)AI is on assessment processes, because "right now, the assignments are all great; we receive all these lovely posters (...) After all, who is producing the product?". (Participant B).

"We will reach a point where, honestly, we will be wasting time, because [the work presented] does not reflect (...) our student. (...) it has to be collaborative work, text analysis work (...) project work, collaborative, exactly with presence in the classroom, debate and reflection in the classroom." (Participant A).

From the perspective of a trainee teacher: "If I know that with one click I can have a result, I will not spend three hours thinking about it, but those three hours give me things that no click gives, right? And they make me develop things that no click does." (Participant D).

Pair 2 – Teaching Dispositions - Guiding Question: Which are already present in practice and which need further development?

The analysis revealed difficulties in identifying teaching dispositions fully integrated into teaching practice. Greater collaboration is observed among students than among teachers, especially in higher education. The dispositions of action and design are partially developed, depending on the individual teacher's involvement. Contextualisation proved difficult in some disciplinary areas, such as History, and research continues to be understood mainly as an academic requirement, little integrated into regular pedagogical practice. It is necessary "to overcome curricula excessively fragmented by competencies and to value more what you called professional dispositions, the way of acting, the way of thinking, of deciding. For me, that was crucial." (Participant F).

Pair 3 – AI Literacy and Ethics - Guiding Question: How to promote teacher and student AI literacy?

Pair 3 emphasised the importance of promoting AI literacy among teachers and students through critical reflection on the roles of teacher and machine, affirming the centrality of pedagogical mediation and the teacher's ethical responsibility. Teacher literacy must occur at all levels of education to promote informed and critical use of AI, as well as its intentional use in the classroom. In this context, reflection is needed on the potentialities and weaknesses of these tools and on their repercussions for teaching, learning and assessment processes. "Critical literacy is what is urgent right now in AI: knowing how to read critically what the machine gives us and select the information (...) A major scientific investment is needed in our training area so as not to accept everything as if it were all correct." (Participant G).

Pair 4 – Regenerative Education - Guiding Question: How can ESEC integrate regenerative practices into the initial teacher education curriculum?

Within initial teacher education, Pair 4 considered that, despite existing investment in AI training actions, it would be pertinent to "create a curricular unit that leads students to explore artificial intelligence in a critical, reflective and ethical way, which we named 'AI, ethical and educational practices'." This would allow different perspectives to be deepened, develop critical awareness and promote responsible use of technology. In parallel, the transversal integration of AI into existing curricular units was proposed, namely in Education Methodologies, through critical analysis of AI-generated texts and guided exploration of their potentialities and limitations - "the teacher can even simulate academic, scientific texts created by AI, so that there are these moments of analysis and

reflection on the veracity of the content, as well as recognising whether that type of text is really scientific or if it was written by AI." (Participant H).

4.2.5. Suggestions for an internal framework:

The contributions from the pair work converge on the need for an internal framework that integrates AI as a pedagogical strategy oriented towards creating challenges and learning opportunities, rather than as a mere response tool (Pair 1). This framework should gradually incorporate teaching dispositions, promoting collaborative teacher work and research on AI as an integral part of professional practice (Pair 2). It should also provide structured spaces for reflection on pedagogical practices with AI, such as discussion forums (Pair 3), as well as the definition of ethical and educational practices, strategies for autonomy in relation to the machine, transversal integration of the AI theme into ESEC's curriculum and continuous investment in teachers' professional development in critical AI literacy (Pair 4).

4.2.6. Conclusions of Focus Group 2 - ESEC

Focus Group 2 confirmed that the integration of AI in Education is a structural challenge, with profound implications for teacher education, pedagogical practices and assessment. Critical, ethical and pedagogical literacy in AI was highlighted as central to safeguarding critical thinking, autonomy and the human dimension of teaching. The need to reconfigure teaching and assessment practices was also emphasised, favouring meaningful, collaborative and reflective tasks capable of distinguishing the human contribution from that of the machine.
 However, relevant cultural, organisational and training constraints persist, reinforcing the need for a clear institutional framework and a regenerative approach to teacher education, oriented towards professional shared responsibility and the critical and equitable integration of (Gen)AI.

4.3. Results of Focus Group 3

Focus Group 3 - *STudIE* (Seminar of Studies and Research in Education), composed of researchers from the Institute of Education of the University of Lisbon, constituted a space for critical and in-depth reflection on the TE-REG *Manifesto* in the context of the emergence of Generative Artificial Intelligence (Gen)AI in teacher education. The discussion validated and expanded the *Manifesto*'s premises, offering essential contributions for the analysis of the ongoing social, cultural and technological transformation.
The main contributions and conclusions of Focus Group 3 can be summarised as follows:

4.3.1. Validation of the *Manifesto*'s central idea: Profound Transformation

Focus Group 3 confirmed the *Manifesto*'s central thesis that (Gen)AI does not represent merely a technological adjustment, but rather a profound transformation in the conditions of education. Participants emphasised that (Gen)AI expands and deepens the possibilities for work and learning, requiring teacher education to move away from a merely instrumental approach to embrace a regenerative vision.

"(...) Artificial intelligence expands the possibilities for work and also deepens the possibilities for work and this expansion, this deepening, I think are important..." Participant A

4.3.2. Need for Discernment and Critical Spirit

One of Focus Group 3's most relevant contributions concerned the non-negotiable importance of critical spirit and discernment on the part of teachers and future teachers. It was

consensual that, faced with (Gen)AI, teachers must retain the capacity to decide on the appropriate and ethical use of these tools. Technology should be seen as a device or instrument that enhances teaching action, but never replaces it, especially in uncertain and diverse classroom contexts.

"...what I think is that it is absolutely fundamental that teachers continue to have a critical spirit and the capacity to decide on the use of that device or instrument..." Participant A

4.3.3. AI as an Asset in Planning and Teaching Action

The group identified (Gen)AI as a huge asset for supporting teachers, particularly in classroom planning. By automating tasks and generating options, AI frees the teacher to focus on what is irreplaceably human, such as interaction, guiding students' discernment and managing complex contexts. This perspective reinforces the synergy proposed by the *Manifesto*, where technology and the teacher play to their strengths.

"(...) to be a huge asset to help teachers in classroom planning and in their action, where they have to act in uncertain and diverse contexts." Participant B.

4.3.4. Ethics and Initial Teacher Education

The discussion highlighted the urgency of integrating (Gen)AI ethics into initial teacher education. The concern expressed about students' temptation to submit AI-generated work as authentic underlines the need to develop in future teachers a robust ethical awareness and the capacity to address these issues with their own students. This point reinforces the importance of focusing training on dispositions (attitudes and values) for teaching, beyond technical competencies.

"...the issue of not trying to deceive others, because, I mean, the students submitted a piece of work as if it were authentic. It was obvious, because the references do not even exist. Therefore, there are a number of ethical issues here." Participant C.

4.3.5. Dissemination and Sharing

Focus Group 3 also served as a dissemination point, with participants expressing the desire to share the *Manifesto* with colleagues and trainers in other training centres. This aspect demonstrates the document's immediate relevance to the national educational community and the need to continue promoting debate across different education cycles, as foreseen by the TE-REG project.

In short, Focus Group 3 with *STudIE* not only validated the *Manifesto*'s relevance but also enriched its application to the Portuguese context, emphasising that teacher education in the (Gen)AI era must be guided by critical discernment, ethics and the exploration of AI as a powerful ally that raises the bar of pedagogical excellence.

"...I felt like showing [the Manifesto] to those who are, colleagues who are trainers and who are in other training centres. I don't know if I can, I think I can." Participant B.

CONCLUSIONS

The three focus groups together reveal a convergent and critical reading of the TE-REG *Manifesto*: the document is valued for its integrated and forward-looking vision on the integration of Generative Artificial Intelligence in teacher education, while also highlighting concrete limitations and obstacles to its implementation in the Portuguese educational context. The discussions underline the relevance of a holistic approach that articulates digital literacy, ethics, regenerative pedagogical

practices and applied research, but they also point to structural, training and social constraints that require coordinated and contextualised responses.

Innovative aspects of the *Manifesto*

In the field of continuing teacher education, Focus Group 1 recognised in the *Manifesto* an innovative proposal for quality education supported by a holistic vision that balances human and technological knowledge. Critical digital literacy was highlighted, understood as the capacity for ethical and contextual reflection on technologies, and the promotion of more meaningful and collaborative pedagogical practices was valued. The importance of sustained professional effort and collective commitment as vectors of transformation in school practices was also emphasised.

In the field of initial teacher education, Focus Group 2 considered the *Manifesto* innovative for integrating AI literacy as a structuring component of the curriculum for future teachers and for valuing teaching dispositions such as collaboration, contextualisation and design. The document encourages the co-creation of teaching materials using AI and proposes experimental spaces, such as learning laboratories, which can energise the articulation between theory and practice.

In Focus Group 3, researchers valued the *Manifesto*'s robust theoretical and ethical framework, as well as its call to collaborative action between research, training and school practice. They highlighted the centrality of research as a guiding disposition to inform educational policies and practices and recognised the regenerative perspective that articulates technology, inclusion and sustainability.

Aspects difficult to implement in the Portuguese local context

In the field of continuing teacher education, Focus Group 1 identified inequalities in access to and responsible use of technology that compromise equity; insufficient teacher training in the face of AI's rapid evolution; weaknesses in ethical competencies among teachers and families; and organisational limitations in schools that hinder the sustainability of regenerative initiatives without clear guidance, resources and leadership.

Focus Group 2 pointed to the insufficient development of educational research in AI; the scarcity of resources and the need to redesign curricular structures, which could include creating new curricular units or distributing AI content transversally across existing ones; the risk of a top-down approach disconnected from the local context; and the challenge of transferring experimental practices to diverse school realities, especially in contexts with fewer technological and human resources.

In Focus Group 3, gaps were identified in the articulation between research and school practice, the scarcity of institutional incentives for applied research in teacher education on AI, and the ethical and normative controversy that lacks clear and consensual guidance. The need for sustained networks and partnerships was also emphasised, since ad hoc initiatives do not ensure systemic change.

Recommendations and Prospects

Based on the conclusions of the three focus groups, it is recommended to prioritise initial and continuing teacher education that combines technical literacy, ethical reflection and active pedagogical practices; the co-creation of local frameworks that contextualise the *Manifesto* into actions adapted to the territory; investment in applied research and learning laboratories that test regenerative practices in real contexts; the development of strategic partnerships to mitigate access inequalities; and the elaboration of ethical and normative guidance instruments that involve schools, families and the educational community. These measures should be implemented in an articulated and sustained manner so that the *Manifesto*'s transformative potential can materialise in the Portuguese education system.

From these recommendations, the teacher training Centre "Centro de Formação Dr. Rui Grácio" intends to mobilise its associated schools for the co-creation of concrete proposals within the scope of teacher professional development and training plans to be developed in the near future:

- Co-creation of a Framework on AI and Continuing Teacher Education, involving trainers and the Training and Monitoring Section of the Centre's Pedagogical Committee;
- Co-creation of a Framework on AI and Teaching-Learning for associated schools, through the design, implementation and evaluation of a Study Circle with key people;
- Design, implementation and evaluation of continuing professional development programmes on Ethical and Pedagogical Uses of AI in Schools.

For the sustainability of the proposals, the dissemination of reference pedagogical practices will be promoted in subsequent years and the implementation of new training projects will be encouraged, in response to the demands of the changes we are already experiencing in society and education, taking into account the guidelines of the Ministry of Education, Science and Innovation.

The teaching profession thus faces significant challenges and transformations in the face of social changes, from various perspectives, highlighting the need to adapt to increasingly complex and diverse contexts and the importance of strengthening teachers' professionalism, ethics and autonomy in the (Gen)AI era. In summary, we anticipate the need for more robust initial and continuing teacher education, better supported by educational research, more contextualised and more aligned with the demands of contemporary Portuguese society in the (Gen)AI era.

REFERENCES

Bachmann, S., Dhert, S., Elen, J., Ervelius, P., Evens, M., Höhbusch, S., Jusic, L., Madeira, A. C., Muhonen, S., Paula, M. G., Roehrig, M., Romão, V., Schneller, I., Van Ingelghem, M., Vandecandelaere, M., Verburgh, A., Verheye, A-S. & Vučković, D. (2025). *Manifesto. Teacher education regenerated (TE_REG): an integrated view on teacher education in the (Gen)AI era*. Erasmus+ Project. Teacher Education Regenerated (TE_REG). Beyond Competencies. Rethinking and redesigning teacher education curricula in the GenAI Era". Reference: 2024-1-BE02-KA220-HED-000248440. https://te-reg.eu/results/manifesto/

Erasmus+ Project (2024-2027). *Teacher Education Regenerated (TE_REG). Beyond Competencies. Rethinking and redesigning teacher education curricula in the GenAI Era*. Reference: 2024-1-BE02-KA220-HED-000248440. https://te-reg.eu/

Miao, F. & Cukurova, M. (2025). *AI competency framework for teachers*. UNESCO. https://doi.org/10.54675/ZJTE2084