Lecturer training in Generative AI in Higher Education: pilot study at the School of Education of the Polytechnic Institute of Viseu

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***Abstract*—The progress of Generative Artificial Intelligence (GenAI) and its use in educational contexts presents higher-education institutions with a dual challenge: harnessing GenAI's potential for pedagogical innovation purposes while addressing its inherent ethical risks to academic integrity. This article outlines an exploratory project centred on lecturer training at the School of Education (ESEV) of the Polytechnic Institute of Viseu (IPV), with the aim of integrating GenAI into teaching practice in a critical and responsible manner. The methodology comprises an initial diagnosis of the lecturers' perceptions regarding GenAI and their AI literacy, a comprehensive inventory of available tools, and the creation of an interdisciplinary Study Group. In addition, practical workshops tailored for different disciplines will develop the lecturers' technical and pedagogical competences. The project will culminate in evidence-based pedagogical recommendations and a comprehensive practical manual, ultimately contributing to the enhancement of teaching activities and fostering a culture of ethically grounded innovation.**

Keywords—Generative Artificial Intelligence, Higher Education, Pedagogical Innovation, Lecturer Training, AI Literacy

I. INTRODUCTION

The emergence of Generative Artificial Intelligence (GenAI) applications, that span far beyond ChatGPT, has sparked intense debate about their potential for pedagogical innovation in higher education [1]. These tools, capable of generating new content from the analysis of large datasets and databases [2], present a dual scenario. On the one hand, they offer opportunities to diversify and personalise pedagogical practices, simulating dialogues or supporting the accomplishment of assignments [3], [4]. On the other hand, they raise critical questions about the authenticity of academic work and the risk of reduced student engagement in the learning process [1].

The adoption of GenAI necessitates a strategic approach that extends beyond mere technological implementation. Reports from organisations such as APRU[1] and EDUCAUSE[2] warn of the fragmentation of institutional practices, which vary between restriction and adoption without clear guidelines, potentially exacerbating existing inequalities [5], [6]. Ethical concerns are central, ranging from plagiarism and the "outsourcing" of intellectual tasks [7] to the problem of "hallucinations" — responses that are seemingly coherent but factually incorrect [8], [2].

[1] https://apru.org/
[2] https://www.educause.edu/

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In this context, UNESCO and the European Union's Artificial Intelligence Act[3] reinforce the need to promote "AI literacy" as an educational pillar [9], [10]. This particular type of literacy implies that teachers and students understand not only the technical functioning of systems but also their ethical and legal limits, including issues such as data privacy, copyright, and non-discrimination, as well as biased content creation. Teacher training thus emerges as a critical factor, as many teachers recognise the potential of AI, and GenAI in particular, but feel they need training to integrate it effectively and ethically into their teaching activities [11], [12].

Within this framework, the present project aims to provide educators at the School of Education of the Polytechnic Institute of Viseu (ESEV-IPV) with tools and guidelines for the critical and innovative integration of GenAI. This contribution is expected to contribute to aligning teaching practices with contemporary requirements and the fundamental values and goals of education in the higher education context.

II. Project Overview

The project, entitled "Generative Artificial Intelligence in Higher Education: an exploratory study on teacher training for pedagogical innovation," will last 24 months and is designed according to a multi-phase approach. Its main goal is to investigate and promote teacher training for the adoption of GenAI as tools in both innovative and responsible manners. This project encompasses five main tasks:

1. Analyse teachers' perceptions and level of digital literacy

The initial phase involves an in-depth diagnosis, conducted through questionnaire surveys and semi-structured interviews. The aim is to analyse how teachers perceive the advantages, risks, and challenges of GenAI, as well as their degree of AI literacy and openness to innovation. The data collected and analysed with contribute to identifying the barriers, expectations, and specific training needs of the teaching staff.

2. Map and analyse a delimited set of Generative AI tools relevant to higher education

The project includes a selective and criteria-based mapping and critical comparative analysis of Generative AI tools with current or potential relevance for higher education. The tools will be organised according to pedagogical use categories (e.g., writing support, multimodal content creation, intelligent tutoring, or feedback analysis) and evaluated according to indicators as to their pedagogical suitability, usability, accessibility, and ethical compliance, in alignment with the European Union's *Artificial Intelligence Act* [10].

The selection and analysis will draw on criteria and indicators grounded in the literature reviewed and on documented practices adopted in recent studies, prioritising evidence concerning the critical and responsible integration of Generative AI in educational contexts [3], [4], [5], [6]. This approach combines both methodological rigour and pedagogical relevance, ensuring that the outcomes are meaningful and applicable within higher education settings.

3. Promote a collaborative and interdisciplinary Study Group

This project also envisions the creation of a permanent working group, comprising lecturers from various subject areas at ESEV, to discuss cross-cutting issues. Topics such as the balance between innovation and academic integrity, adapting current assessment criteria and designing new ones, and developing strategies to mitigate technological dependence will be among the core topics discussed within the group. This initiative aims to promote and foster a culture of sharing, in line with the recommendations of APRU [5].

To reinforce the theoretical foundations of the project, this proposal is grounded in established research on professional teaching development and communities of practice. The literature reviewed has shown that effective professional development is based on collaborative activities, structured reflections, peer support, and contextualised learning activities, closely linked to the professional reality of teachers [17], [18]. The concept of communities of practice (CoP), introduced by Wenger and Wenger-Trayner [17], provides an appropriate theoretical framework to guide the creation of the proposed Study Group. In this context, the group functions as an institutional CoP, where teachers participate collaboratively in critical discussions, share practices, and co-construct knowledge about the integration of IAGen in higher education.

This collaborative environment supports the principle of legitimate peripheral participation, allowing participants to gradually evolve from initial involvement to more active and leadership roles in the reflective process [18], [19]. In line with recent studies on professional development around generative AI, several international initiatives emphasise the importance of AI literacy and practical training to ensure the ethical and pedagogically sound use of these technologies [20], [21]. Thus, the aim is for the Study Group to not be limited to the exchange of experiences but also become a structured space for continuous learning and pedagogical innovation, supported by approaches based on scientific evidence.

4. Organise specific training workshops by subject area

The organisation of practical, segmented workshops to train teachers in the technical and pedagogical use of IAGen is another activity planned in the context of this project. Through the adoption of a 'learning by doing' approach, these sessions will include the exploration of contextualised application cases, the deconstruction and discussion of ethical challenges specific to each area, and the development of pilot lesson plans.

5. Consolidate and disseminate results

The project's final phase will focus on compiling and sharing the knowledge acquired through the development of evidence-based recommendations and a comprehensive practical manual, featuring concrete examples and guidelines for integrating GenAI in educational contexts. Findings will be disseminated through peer-reviewed publications and conference presentations, thus contributing to the

[3] https://digital-strategy.ec.europa.eu/pt/policies/regulatory-framework-ai

dissemination of the results and further discussion on artificial intelligence in education.

Rather than just outlining specific mitigation measures, the project seeks to acknowledge and critically reflect on some of the vulnerabilities identified, pinpointing them within the context of higher education by using ESEV as a case study. Such awareness constitutes, in itself, an essential element of organisational and scientific learning [6]. Accordingly, the project values flexibility and continuous adaptation as guiding principles, recognising that the integration of GenAI requires progressive and iterative adjustments according to evolving institutional, ethical, and technological conditions [5], [9].

III. Expected Results

The project is designed to generate a set of practical and strategic results with direct applicability at ESEV and, hopefully, relevant to a broader academic community. These contributions entail the following expected results:

- Detailed mapping of the perceptions and training needs of ESEV teachers, which will serve as a basis for future interventions.
- Collaborative online inventory and comparative matrix of GenAI tools, selected according to specific criteria and analysed and compared according to technical, pedagogical, and ethical indicators, to support informed technology selection.
- ESEV online comprehensive practical manual with guidelines, examples of GenAi use in teaching activities, and strategies to promote co-creation and avoid plagiarism.
- Pilot lesson plans and scripts, tested and optimised for different subject contexts, are adoptable and adaptable as models for other teachers.
- A permanent Study Group that will promote and nurture innovation and ongoing institutional reflection on issues that bridge GenAI and teaching activities.

As for the creation, evaluation, and updating of the content shared regarding each subject (i.e. subject syllabus, class activities, assessment methodology, etc.), this process is expected to evolve in a collaborative, gradual, and reflective manner, engaging the various project participants — lecturers, trainers, and researchers — through a model of co-creation and shared validation. The literature on educational innovation and professional development highlights that sustainable educational resources typically emerge from iterative processes in which design, experimentation, and reflection are continuously interlinked [17], [18].

Accordingly, the methodological stance of the team will remain exploratory and open, favouring interdisciplinary dialogue and organisational learning. The subject syllabus and proposed activities are envisioned as progressive, consolidated results of adopted practices, adapted as the project evolves, and moulded in accordance with inputs received from discussions and experiences conducted by the Study Group (community of practice), teachers, and feedback and contributions from students. Rather than providing closed final products, the subject syllabus and proposed activities are intended to serve as dynamic, adjustable and evolving tools and contents, moulded by ongoing iterative reviews and the integration of new contributions, ensuring their relevance and updated nature suitable for responding to the rapid transformation of GenAI in education [9], [6].

IV. Expected Impacts

The impacts of this project may be distributed across three levels: institutional, professional, and student.

At an institutional level, the project will contribute to the development of a strategic and informed approach for integrating GenAI into ESEV-IPV teaching activities and teacher training. Instead of reactive policies, the institution will benefit from shared and collaboratively designed guidelines, a culture of proactive pedagogical innovation, and assessment mechanisms in tune with current digital adoption and transformation challenges in higher education. This will promote and nurture a continuous improvement attitude towards the quality of teaching and learning practices within the institution.

At a professional level, the most direct impact will be on teacher training. Teachers will be able to acquire not only technical skills, but also the confidence and critical literacy necessary to use GenAI as a pedagogical ally, fostering creativity and independent thinking in students. The creation of spaces for interdisciplinary dialogue, through the Study Groups, will strengthen collaboration and knowledge sharing.

Ultimately, at the student level, the project aims to enhance the educational experience for students. By promoting critical and ethical use of GenAI, the project will contribute to the strengthening of students' digital and AI literacy and critical thinking competences. The dissemination of results through publications and other channels will further contribute to national and international discussions on the future of higher education by providing a framework that other institutions can eventually adapt and adopt according to their needs.

V. Final Considerations

The integration of Generative Artificial Intelligence in higher education is a complex challenge, which involves both a high potential for pedagogical renewal [3], [4] and fundamental questions about assessment, ethics, and the role of the teacher [7], [5]. This project addresses this challenge in a proactive and structured way, based on the principle that technology alone does not guarantee innovation. The key to successful integration lies in a triple axis: continuous teacher training, regulatory adaptation of institutions, and the promotion of a culture of integrity and critical thinking, as suggested by entities such as APRU [5].

Beyond its institutional contribution, this project is part of a broader international movement aimed at enhancing teacher training for the critical integration of Generative AI in higher education. Initiatives such as *Making AI Generative for Higher Education* (Ithaka S+R, USA/Canada) have promoted AI literacy and professional development programmes designed to support the responsible use of these technologies [16]. Similarly, universities such as the University of Texas at Austin and Vanderbilt University have developed workshops and pedagogical guides focused on the ethical and creative use of GenAI in teaching [14], [13]. At the European level, studies such as the one conducted at the University of Derby [15]

emphasise the importance of collaborative workshops and interdisciplinary communities of practice, which enable teachers to explore the formative and creative potential of AI.

In this context, the described ongoing project at the School of Education in Viseu assures its multifaceted and contextualised approach by combining diagnosis, training, and applied research. Its alignment with the European Union's *Artificial Intelligence Act* [10] ensures an ethical and regulatory coherence, while its focus on the institutional and regional context of the School of Education adds further relevance to the work done. Developed within a higher education institution located in Portugal's interior region, this project represents an opportunity to generate transferable knowledge regarding the responsible integration of GenAI in diverse educational settings, thus helping to reduce digital transformation asymmetries and strengthen AI literacy among teachers and future educators [5], [9].

It is recognised that initiatives of this nature may face well-documented risks, such as the limited availability of technical and human resources, the lack of consistent institutional support, and the rapid pace of technological and regulatory change [5], [6], [9], [10], [16]. These factors can influence the sustainability of the actions undertaken and the consolidation of innovative pedagogical practices in higher education.

By focusing on involving and training teachers at the School of Education in Viseu, this study seeks not only to find technical solutions but also to build a community of reflective practice. The ultimate goal is to ensure that the adoption of GenAI serves to enrich teaching and learning experiences, reinforcing the fundamental values of education while striking a balance between innovation and responsibility.

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